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Anvaripour et al.

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(54) **PRESENTING AVAILABLE AUGMENTED REALITY CONTENT ITEMS IN ASSOCIATION WITH MULTI-VIDEO CLIP CAPTURE**

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G06T 19/00 (2011.01)
H04L 51/52 (2022.01)
(Continued)

(52) **U.S. Cl.**
CPC ***G06T 19/006*** (2013.01); ***H04L 51/222*** (2022.05); ***H04L 51/52*** (2022.05); ***H04N 23/631*** (2023.01)

(58) **Field of Classification Search**
CPC G06T 19/006; H04L 51/10; H04L 51/52; H04N 23/631; G06F 3/0482; G06F 3/04847; G06F 3/0488
See application file for complete search history.

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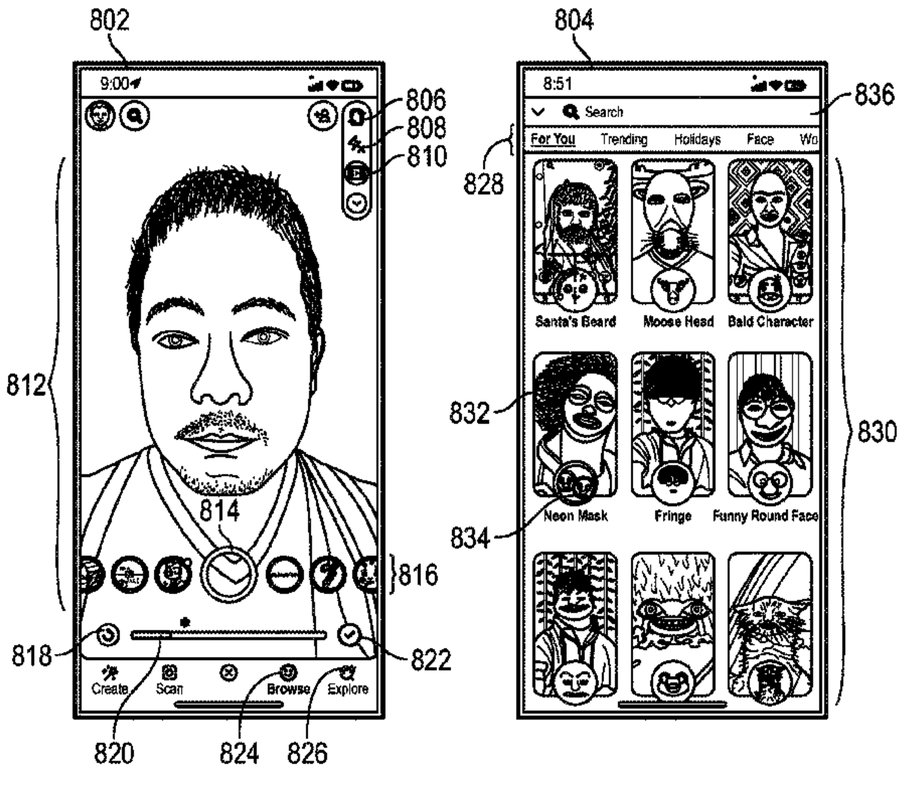
(57) **ABSTRACT**

Aspects of the present disclosure involve a system comprising a computer-readable storage medium storing a program and method for presenting available augmented reality (AR) content items. The program and method provide for displaying a capture interface in accordance with a camera mode configured to capture multiple video clips; displaying a carousel interface for presenting a first set of AR content items, each being selectable to apply respective AR content to captured video; receiving first user input selecting an explore tab included which is selectable to switch to an explorer interface for presenting a second set of AR content items; switching from the capture interface to the explorer interface; receiving, via the explorer interface, second user input selecting an AR content item from among the second set; and updating, in response to receiving the second user input, the first set of AR content items to include the selected AR content item.

19 Claims, 13 Drawing Sheets



(51) **Int. Cl.**
H04L 51/222 (2022.01)
H04N 23/63 (2023.01)

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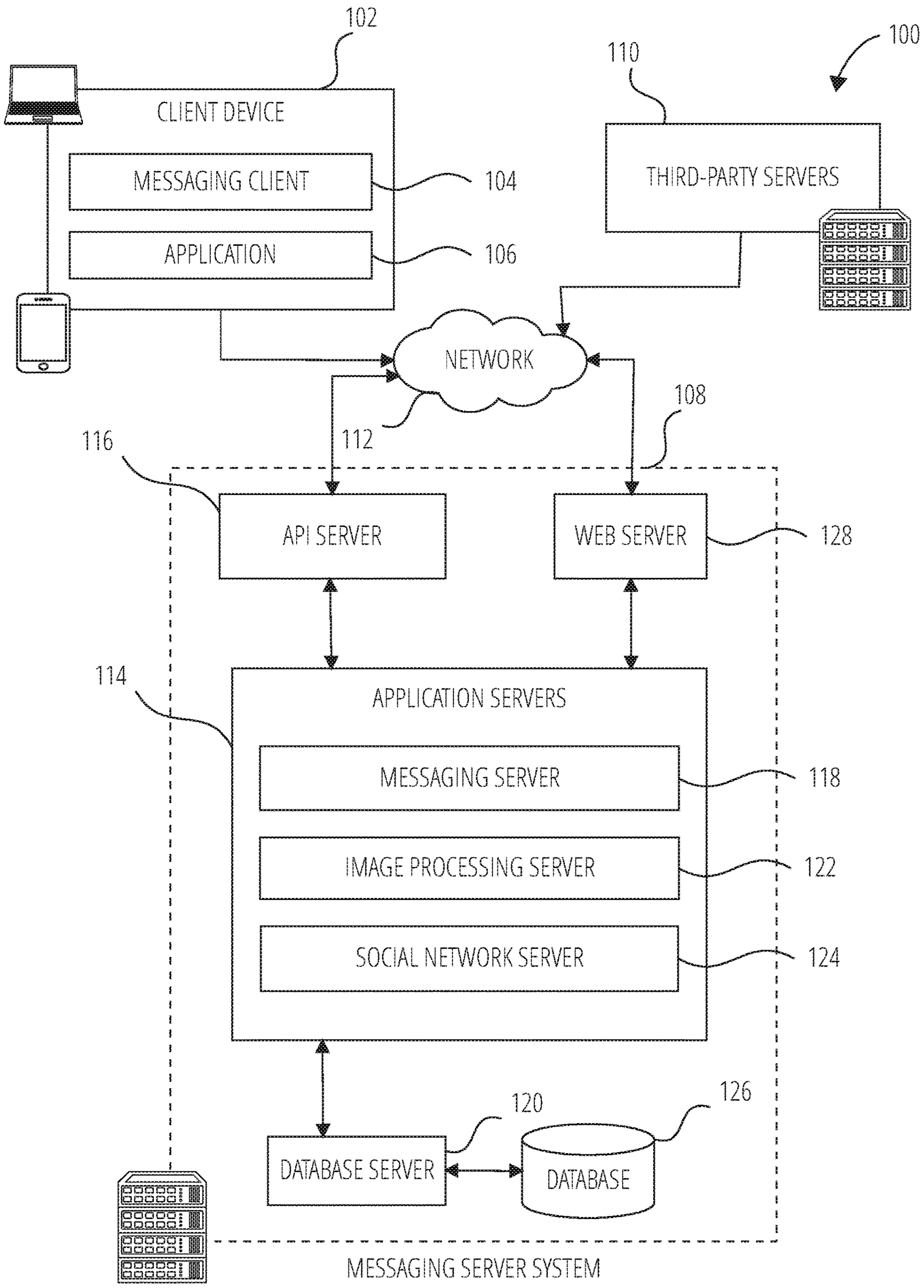
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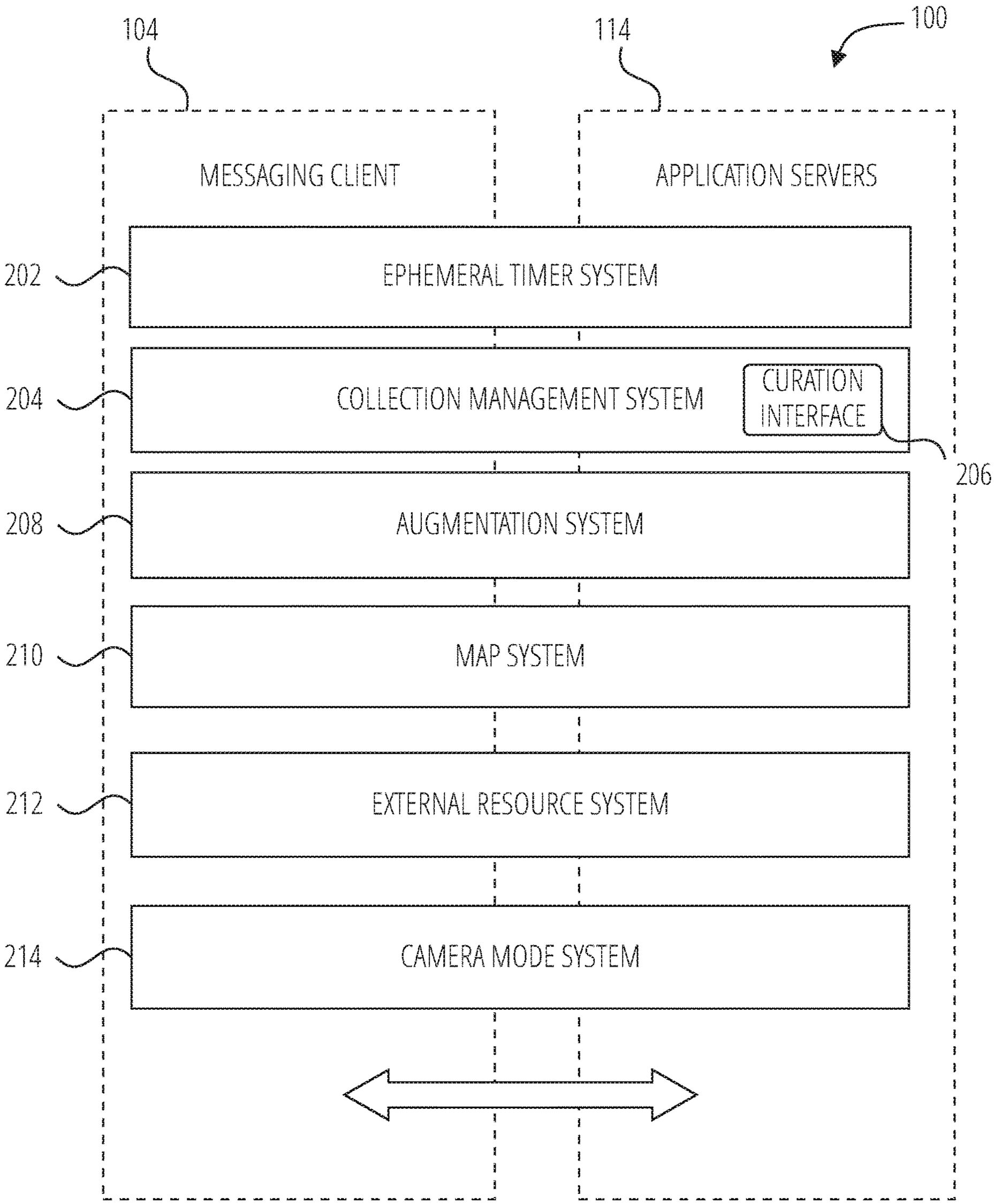
MESSAGING CLIENT
104
APPLICATION
106
110
100
THIRD-PARTY SERVERS
NETWORK
108
112
116
API SERVER
WEB SERVER
128
114
APPLICATION SERVERS
MESSAGING SERVER
118
IMAGE PROCESSING SERVER
122
SOCIAL NETWORK SERVER
124
120
126
DATABASE SERVER
DATABASE
MESSAGING SERVER SYSTEM

FIG. 1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114
100
MESSAGING CLIENT
APPLICATION SERVERS
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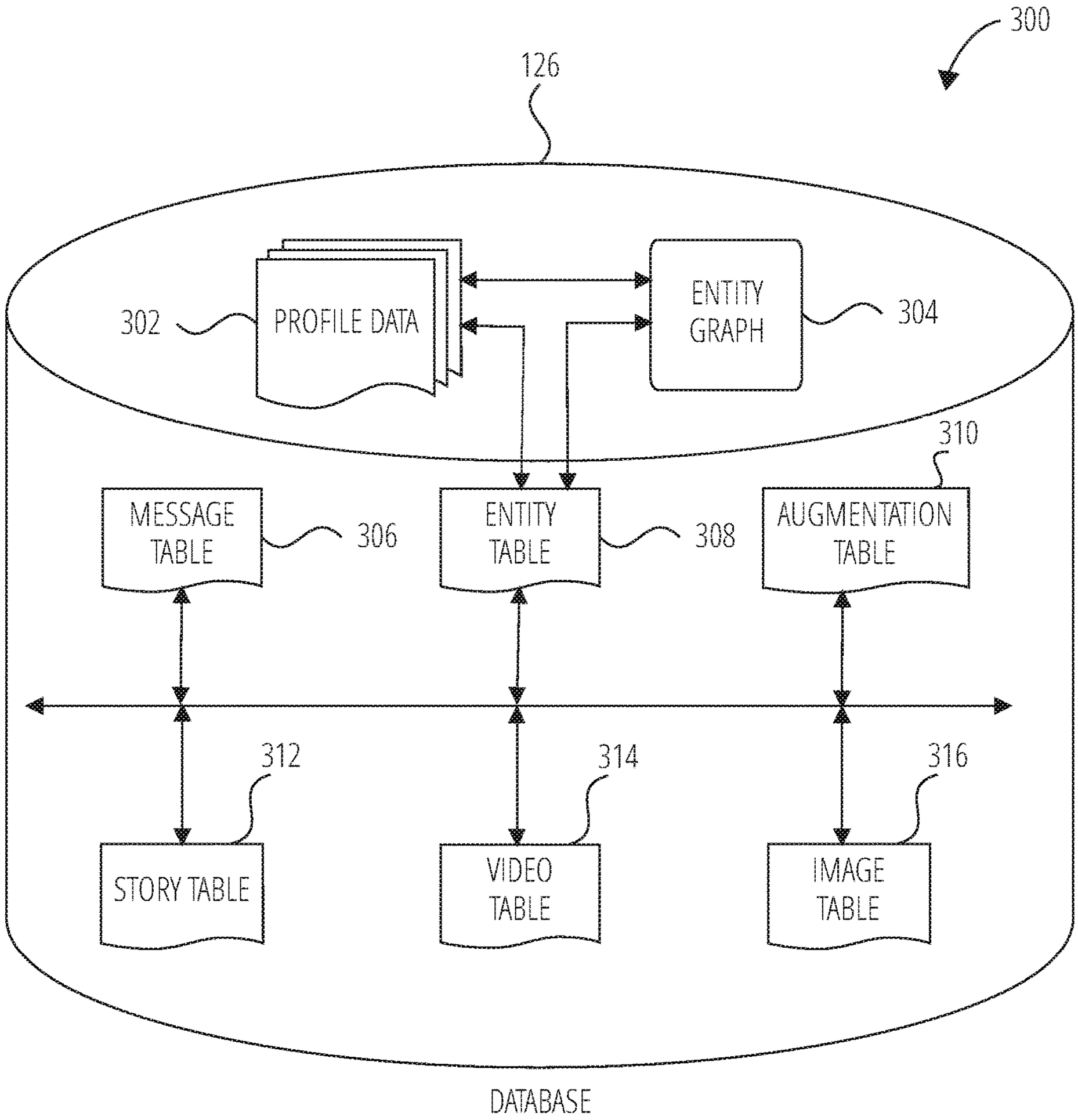
EPHEMERAL TIMER SYSTEM
204
COLLECTION MANAGEMENT SYSTEM
CURATION INTERFACE
206
208
AUGMENTATION SYSTEM
210
MAP SYSTEM
212
EXTERNAL RESOURCE SYSTEM
214
CAMERA MODE SYSTEM

FIG. 2


300
126
302
PROFILE DATA
ENTITY GRAPH
304
310
MESSAGE TABLE
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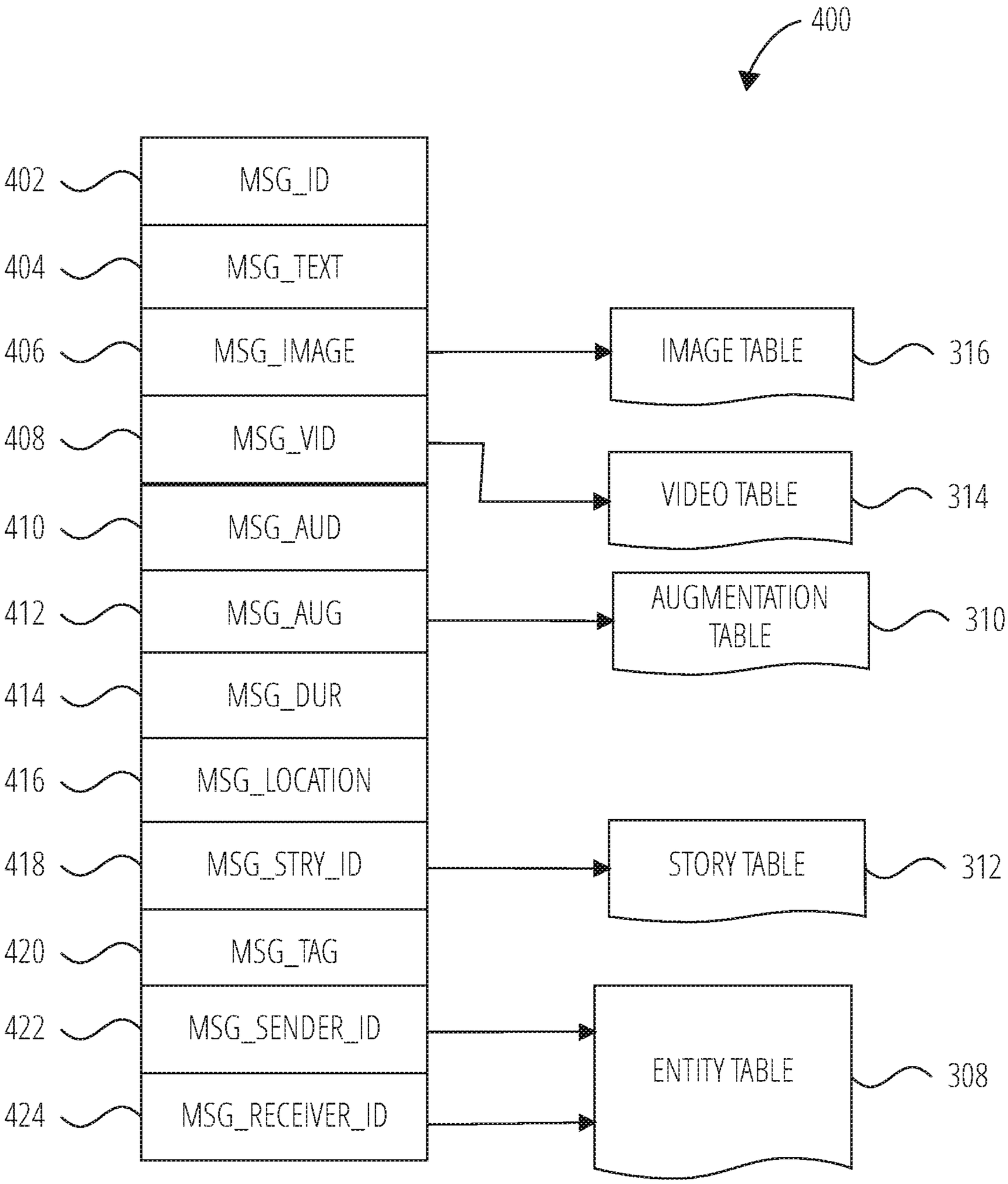
ENTITY TABLE
308
AUGMENTATION TABLE
312
314
316
STORY TABLE
VIDEO TABLE
IMAGE TABLE
DATABASE

FIG. 3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402
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404
MSG_TEXT
406
MSG_IMAGE
408
MSG_VID
410
MSG_AUD
412
MSG_AUG
414
MSG_DUR
416
MSG_LOCATION
418
MSG_STRY_ID
420
MSG_TAG
422
MSG_SENDER_ID
424
MSG_RECEIVER_ID
IMAGE TABLE
316
VIDEO TABLE
314
AUGMENTATION TABLE
310
STORY TABLE
312
ENTITY TABLE
308

FIG. 4

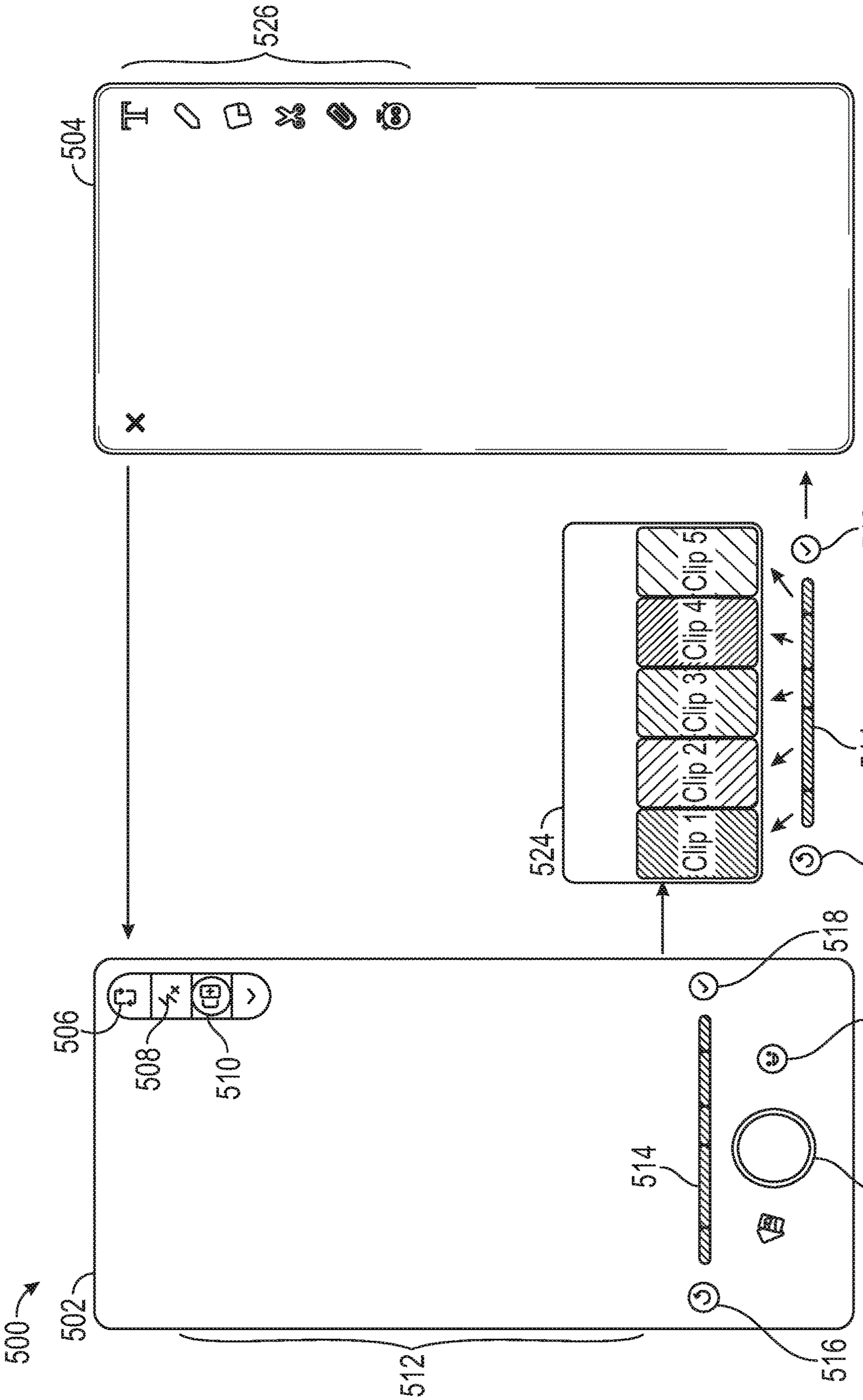

526
504
524
Clip 1
Clip 2
Clip 3
Clip 4
Clip 5
518
514
516
522
520
506
508
510
502
512
500

FIG. 5

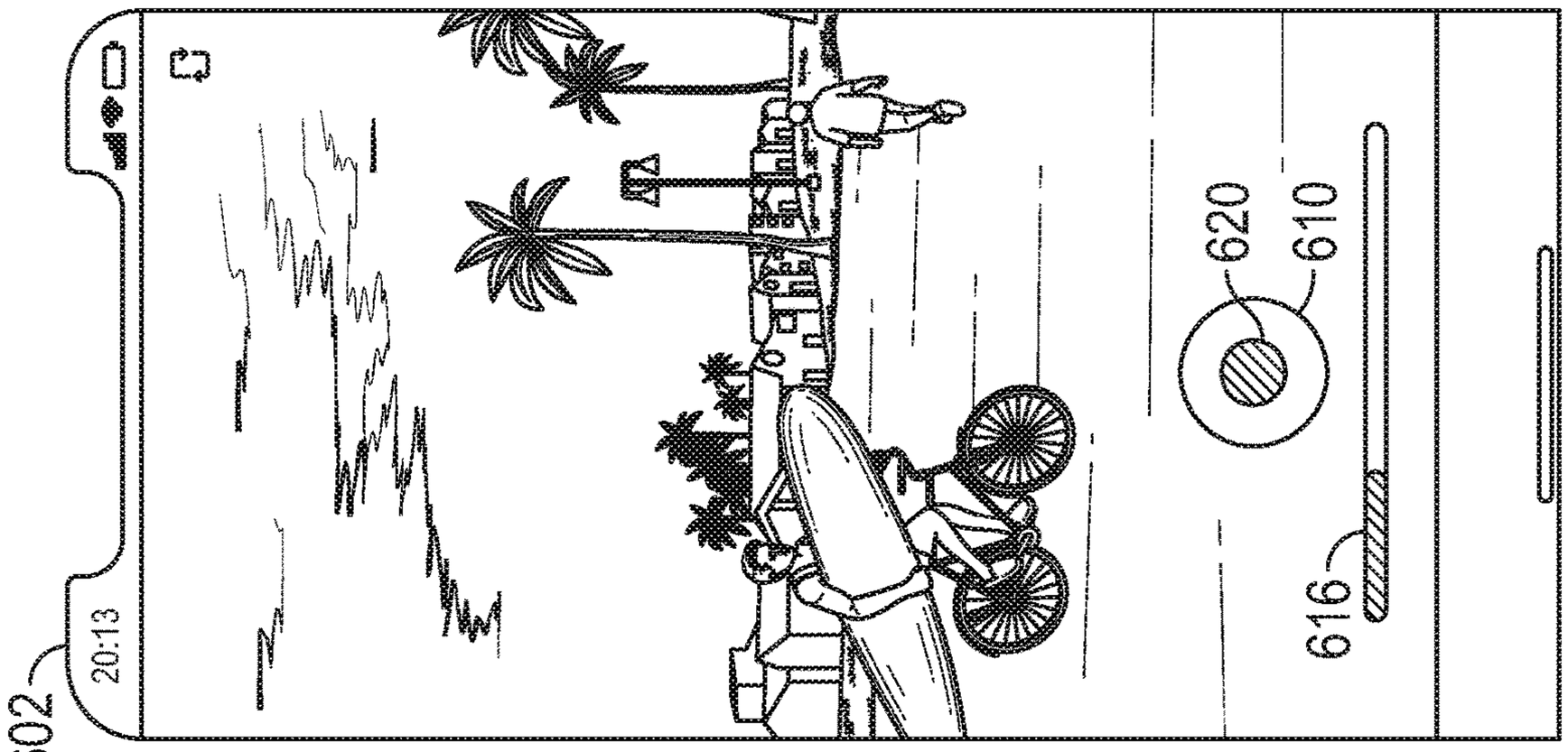


FIG. 6B

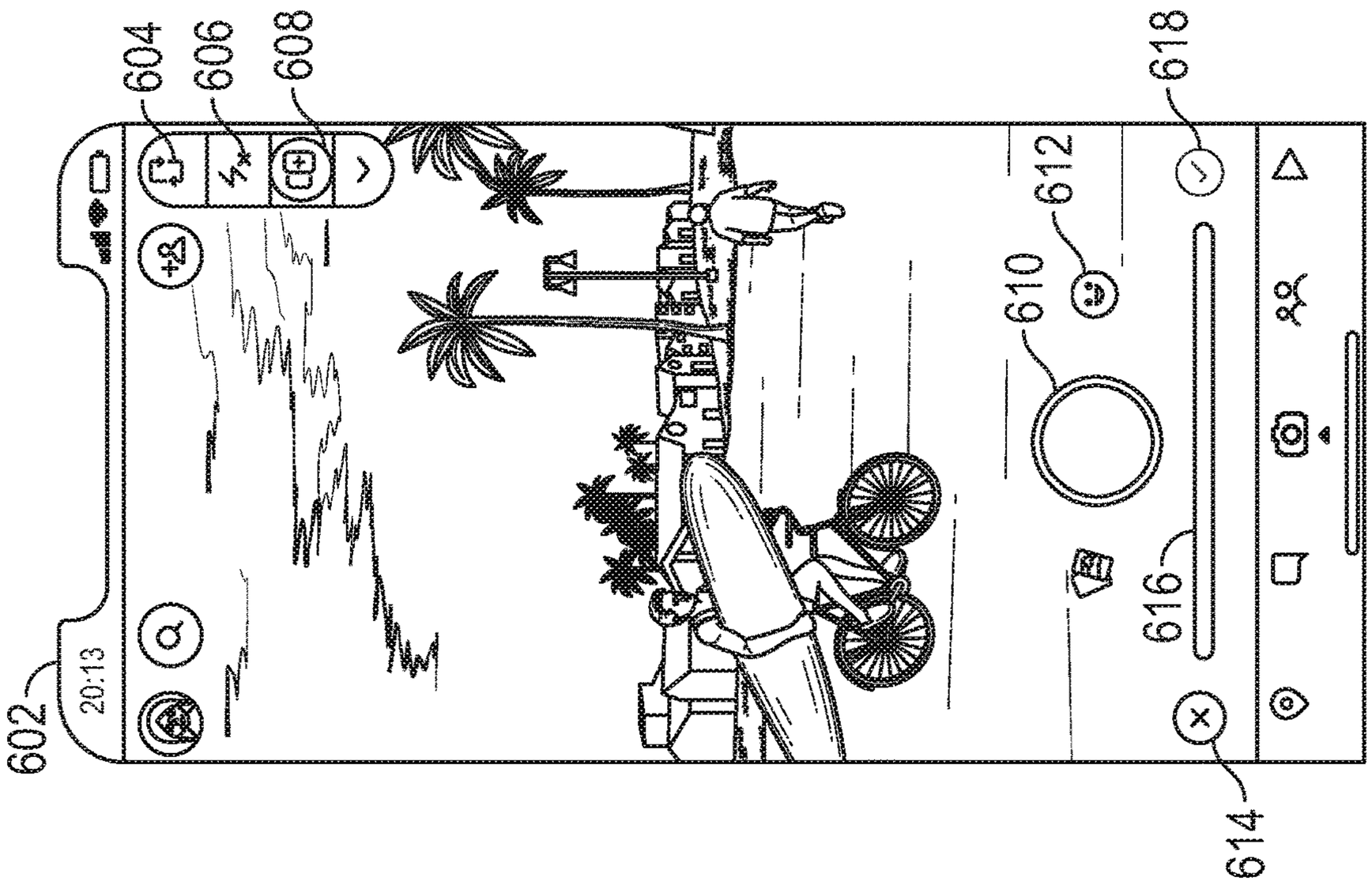


FIG. 6A

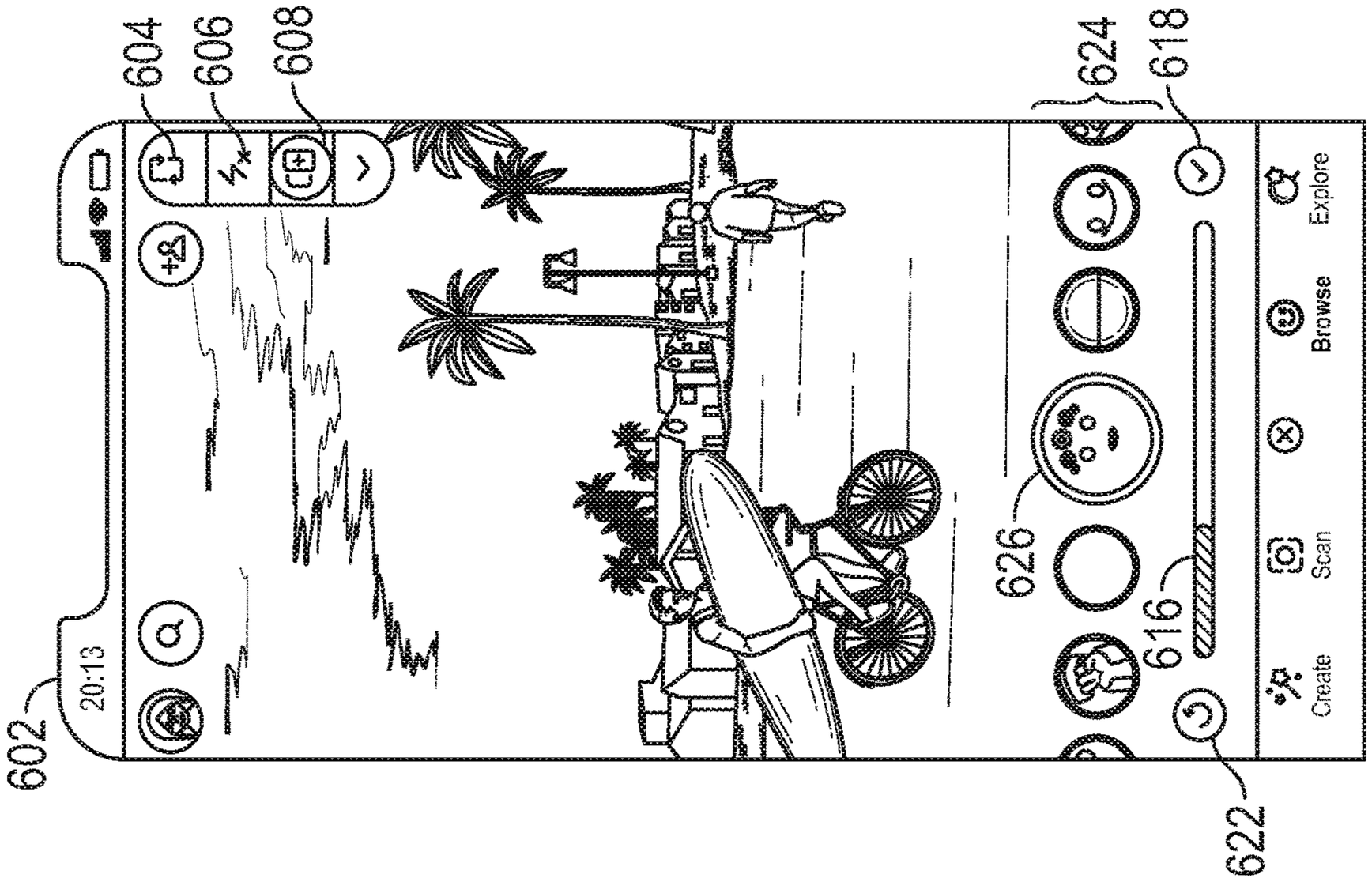
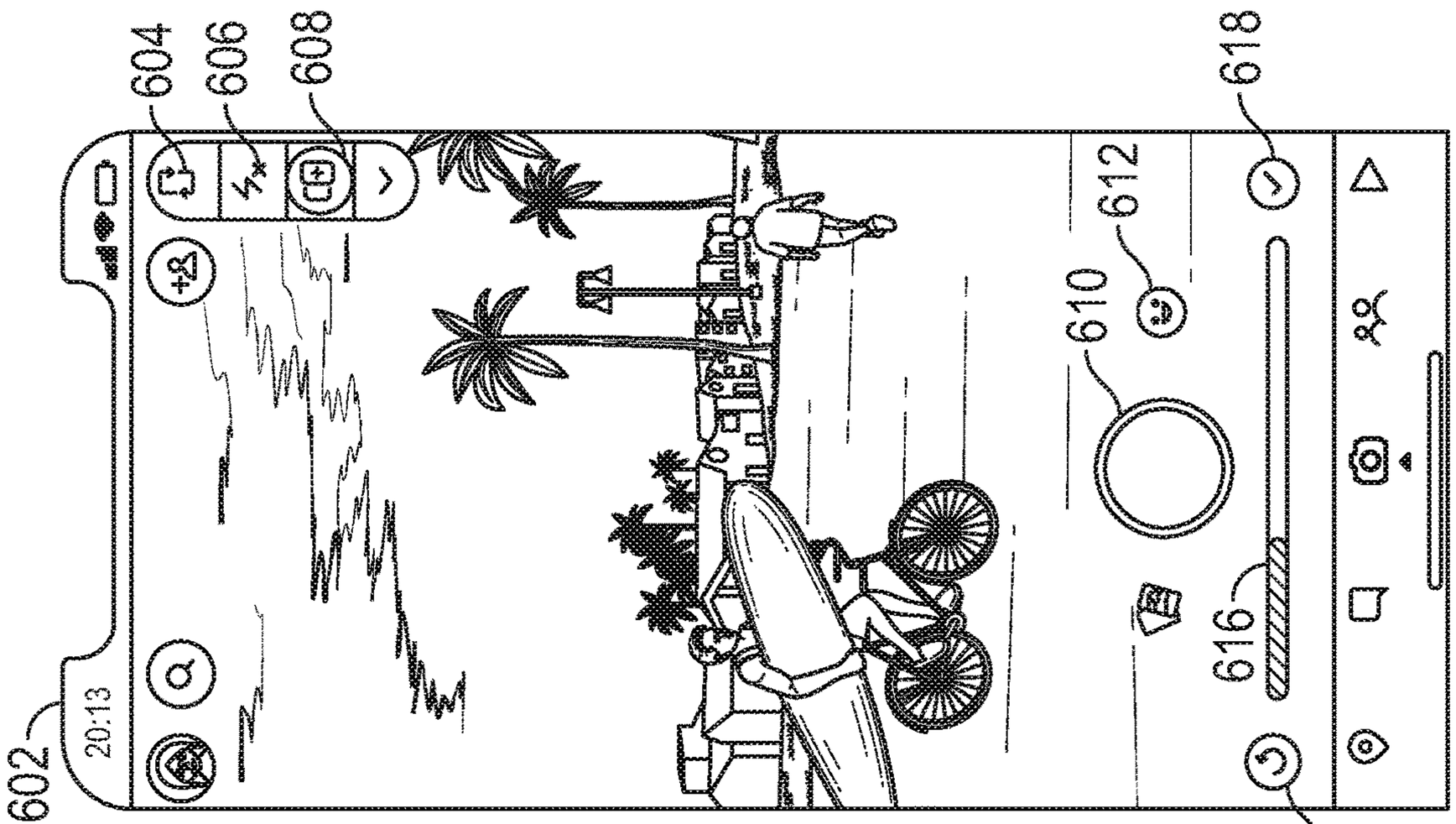

604
606
608
624
618
602
20:13
Explore
Browse
Scan
Create
626
616
622

FIG. 6D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606
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612
602
20:13
610
616
622

FIG. 6C

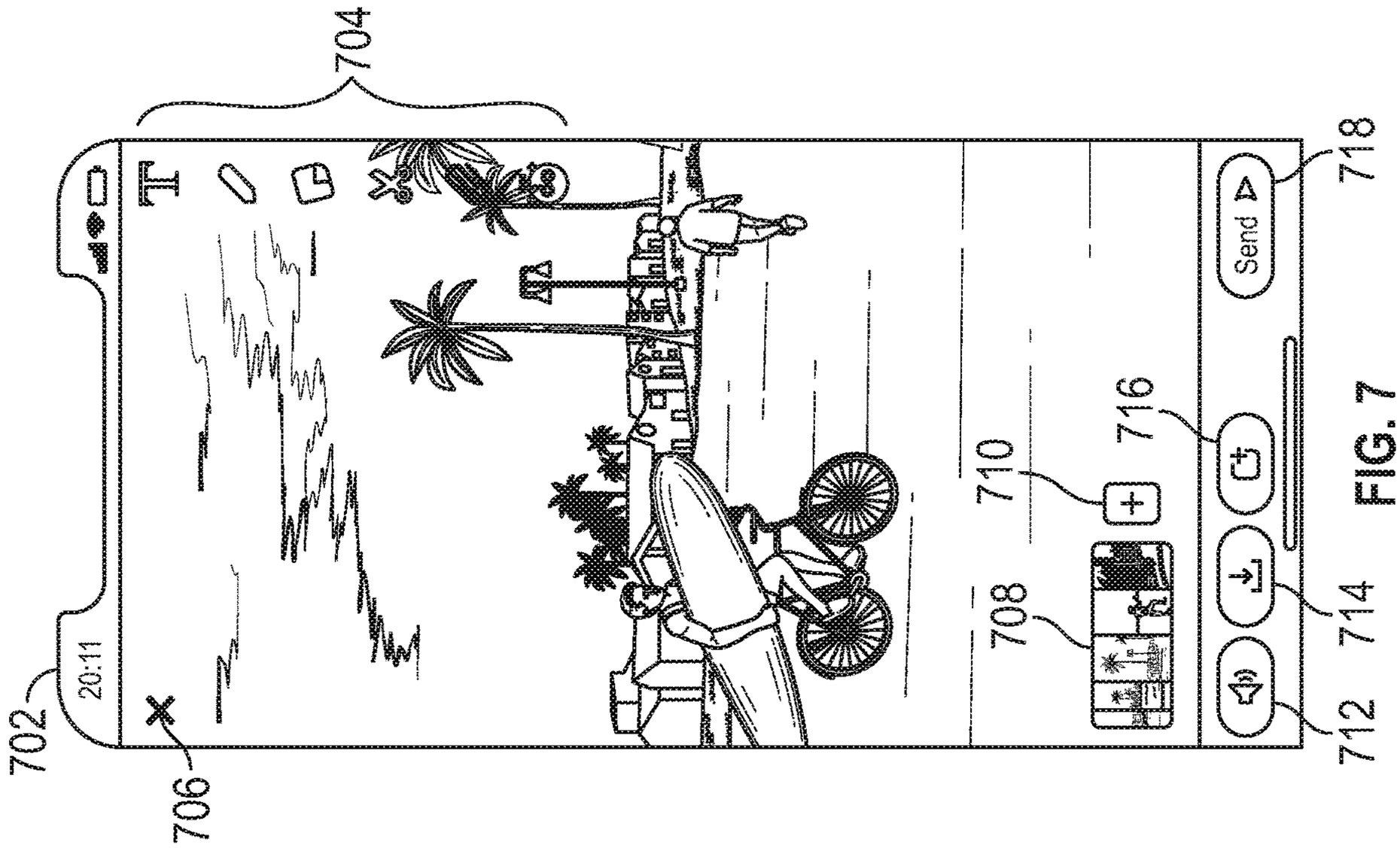
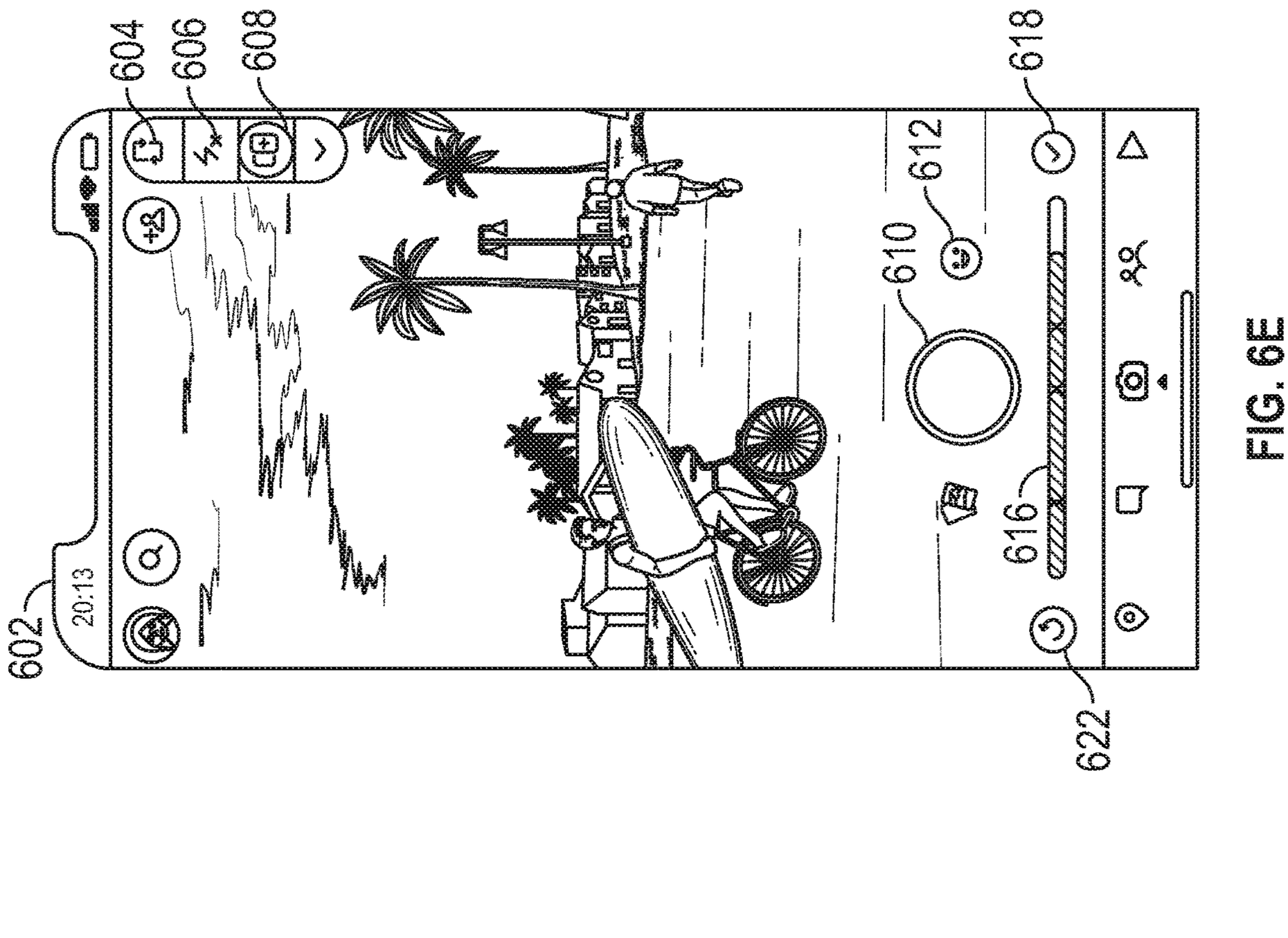

704
718
Send
716
710
708
714
712
702
706
20:11

FIG. 7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616
622
602
20:13

FIG. 6E

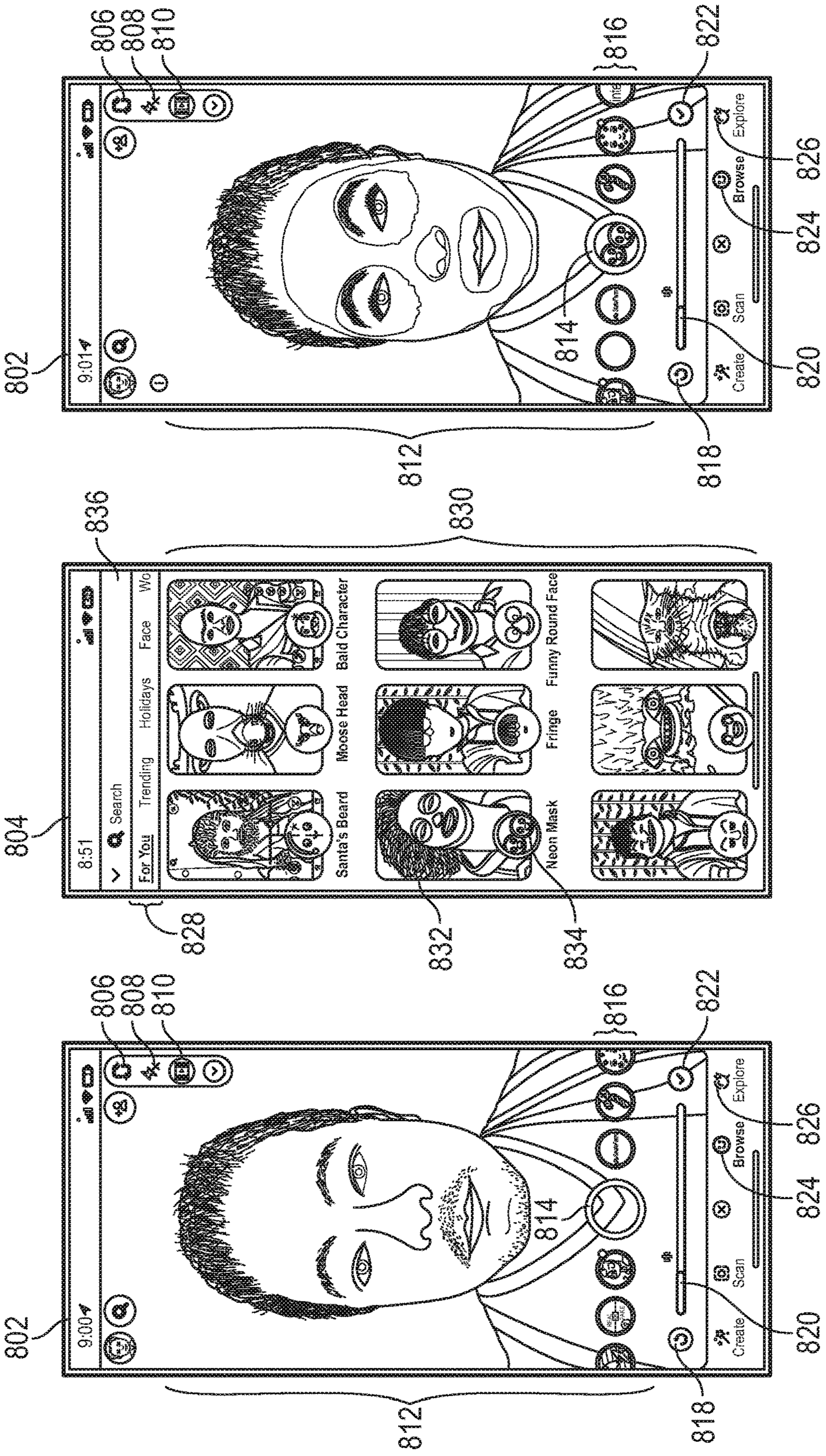


FIG. 8C

FIG. 8B

FIG. 8A

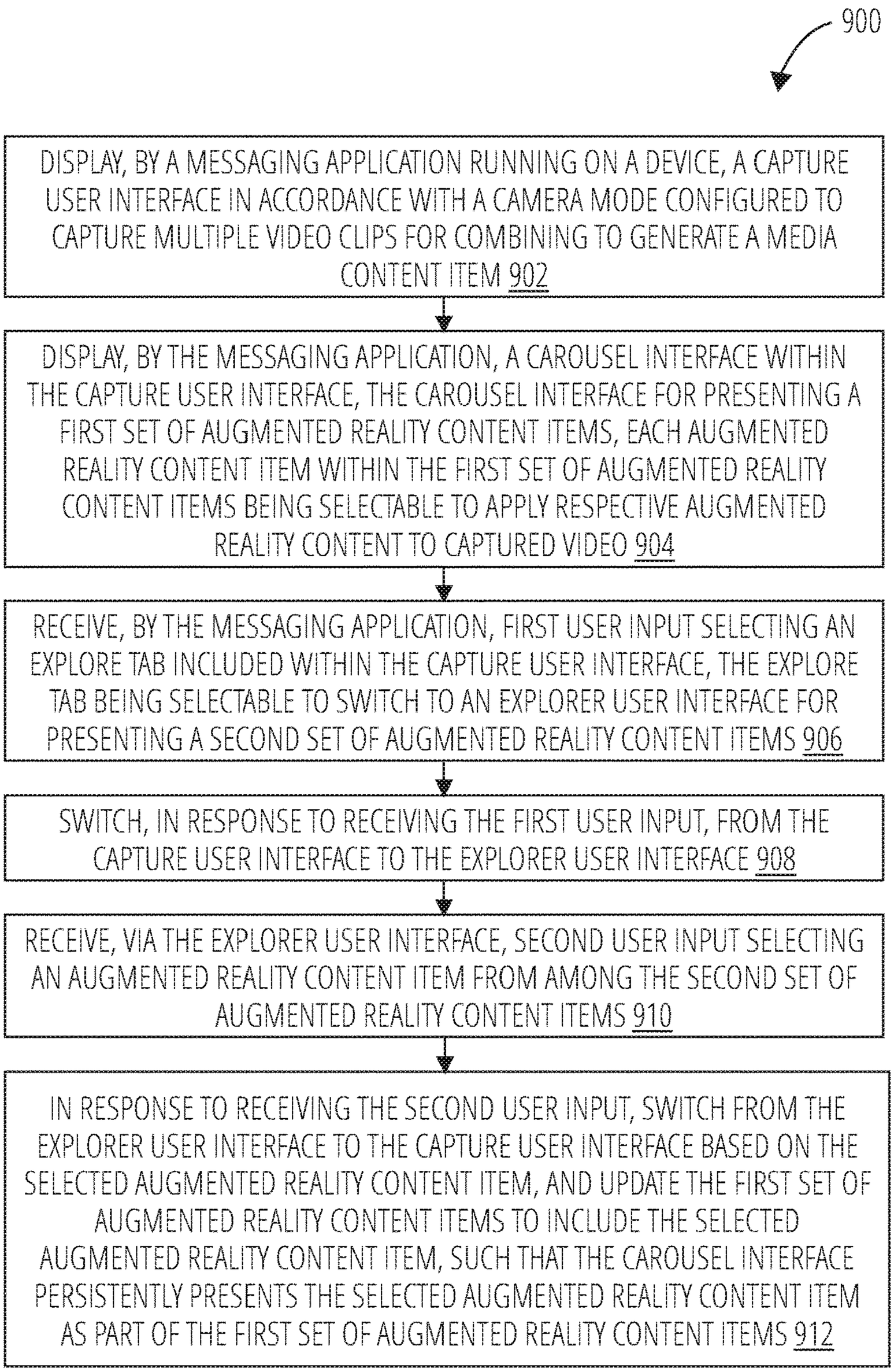
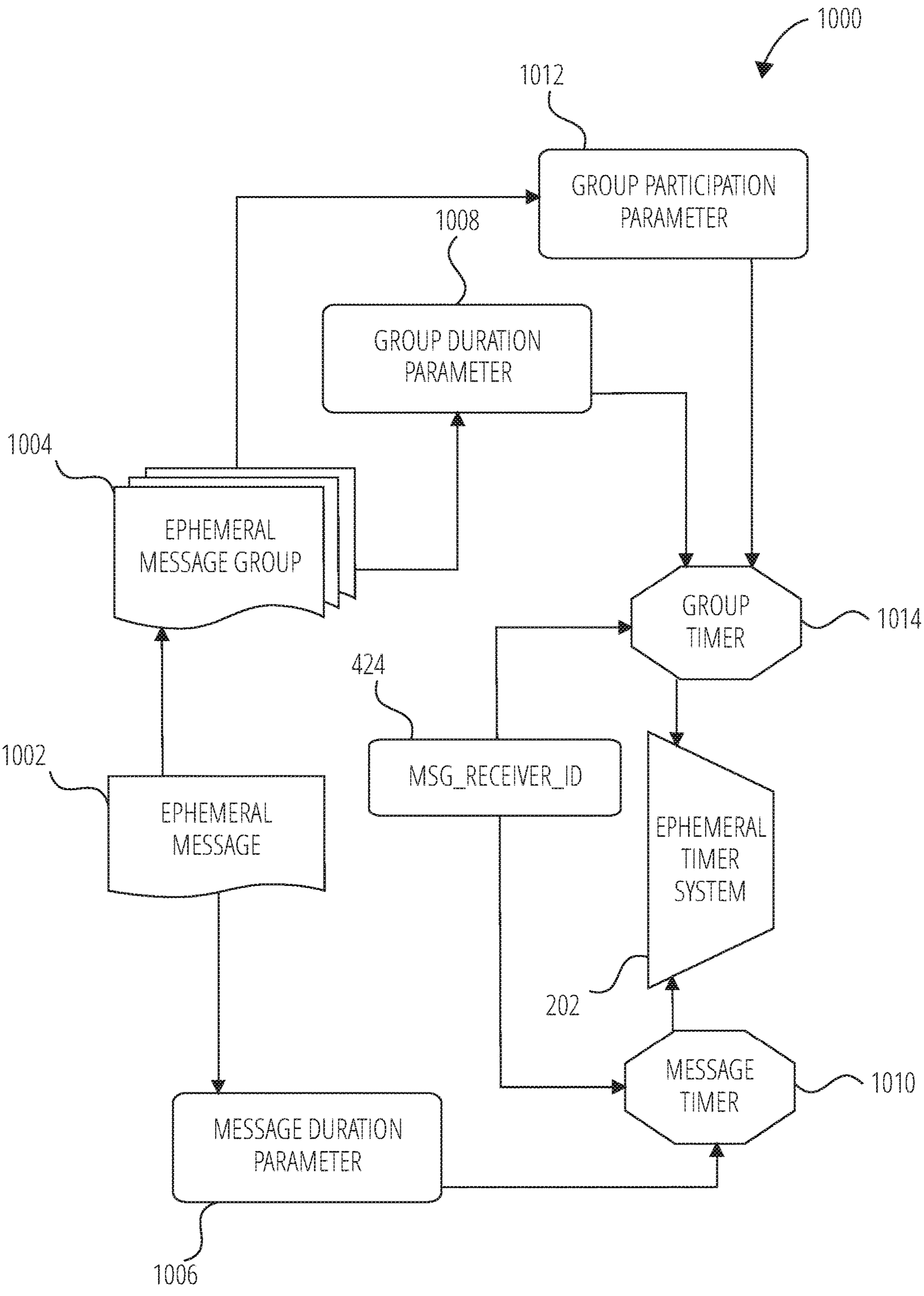

900
DISPLAY, BY A MESSAGING APPLICATION RUNNING ON A DEVICE, A CAPTURE USER INTERFACE IN ACCORDANCE WITH A CAMERA MODE CONFIGURED TO CAPTURE MULTIPLE VIDEO CLIPS FOR COMBINING TO GENERATE A MEDIA CONTENT ITEM 902
DISPLAY, BY THE MESSAGING APPLICATION, A CAROUSEL INTERFACE WITHIN THE CAPTURE USER INTERFACE, THE CAROUSEL INTERFACE FOR PRESENTING A FIRST SET OF AUGMENTED REALITY CONTENT ITEMS, EACH AUGMENTED REALITY CONTENT ITEM WITHIN THE FIRST SET OF AUGMENTED REALITY CONTENT ITEMS BEING SELECTABLE TO APPLY RESPECTIVE AUGMENTED REALITY CONTENT TO CAPTURED VIDEO 904
RECEIVE, BY THE MESSAGING APPLICATION, FIRST USER INPUT SELECTING AN EXPLORE TAB INCLUDED WITHIN THE CAPTURE USER INTERFACE, THE EXPLORE TAB BEING SELECTABLE TO SWITCH TO AN EXPLORER USER INTERFACE FOR PRESENTING A SECOND SET OF AUGMENTED REALITY CONTENT ITEMS 906
SWITCH, IN RESPONSE TO RECEIVING THE FIRST USER INPUT, FROM THE CAPTURE USER INTERFACE TO THE EXPLORER USER INTERFACE 908
RECEIVE, VIA THE EXPLORER USER INTERFACE, SECOND USER INPUT SELECTING AN AUGMENTED REALITY CONTENT ITEM FROM AMONG THE SECOND SET OF AUGMENTED REALITY CONTENT ITEMS 910
IN RESPONSE TO RECEIVING THE SECOND USER INPUT, SWITCH FROM THE EXPLORER USER INTERFACE TO THE CAPTURE USER INTERFACE BASED ON THE SELECTED AUGMENTED REALITY CONTENT ITEM, AND UPDATE THE FIRST SET OF AUGMENTED REALITY CONTENT ITEMS TO INCLUDE THE SELECTED AUGMENTED REALITY CONTENT ITEM, SUCH THAT THE CAROUSEL INTERFACE PERSISTENTLY PRESENTS THE SELECTED AUGMENTED REALITY CONTENT ITEM AS PART OF THE FIRST SET OF AUGMENTED REALITY CONTENT ITEMS 912

FIG. 9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1008
GROUP DURATION PARAMETER
1004
EPHEMERAL MESSAGE GROUP
GROUP TIMER
1014
424
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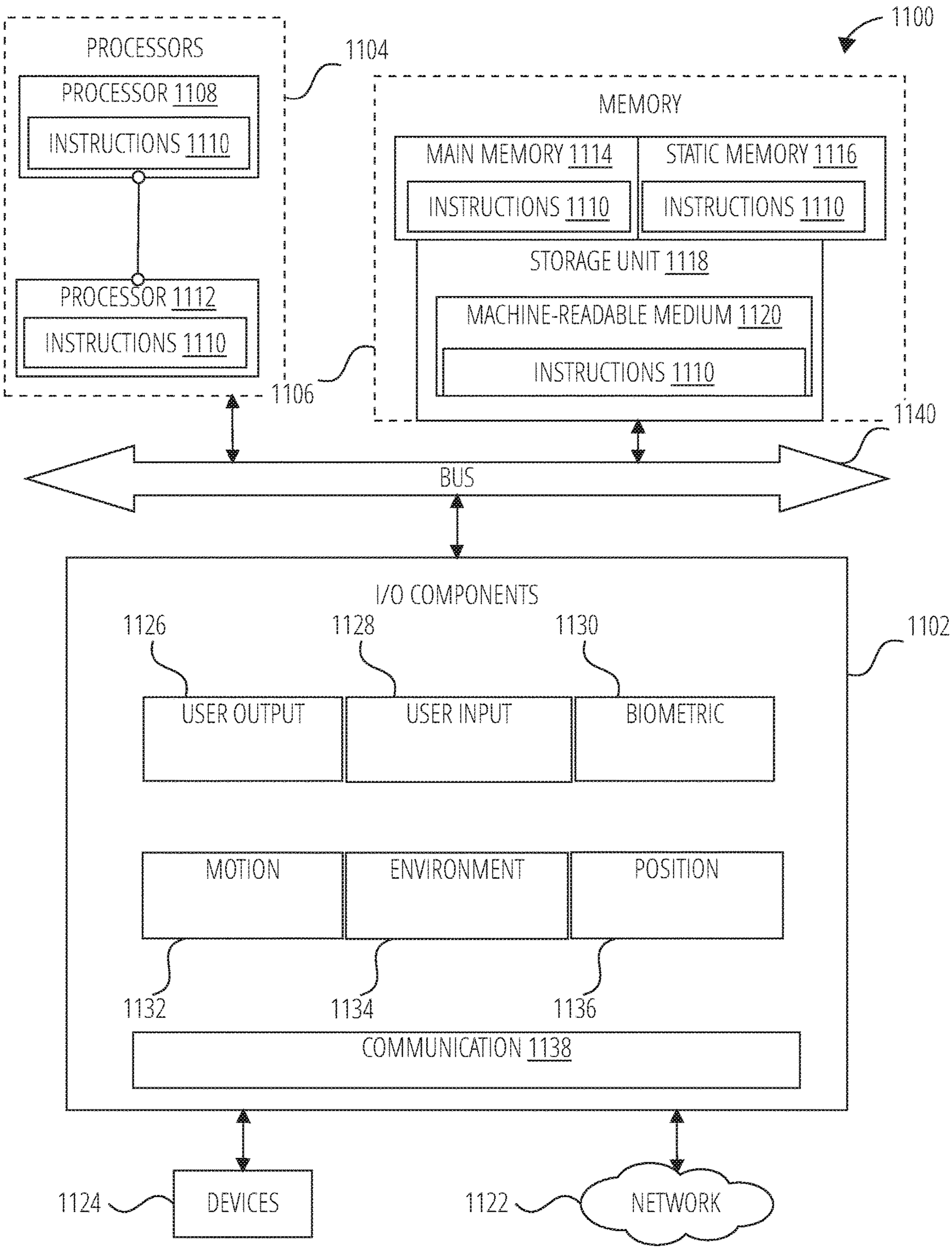
EPHEMERAL MESSAGE
MSG_RECEIVER_ID
EPHEMERAL TIMER SYSTEM
202
MESSAGE TIMER
1010
MESSAGE DURATION PARAMETER
1006

FIG. 10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PROCESSOR 1108
INSTRUCTIONS 1110
PROCESSOR 1112
INSTRUCTIONS 1110
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MEMORY
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INSTRUCTIONS 1110
STATIC MEMORY 1116
INSTRUCTIONS 1110
STORAGE UNIT 1118
MACHINE-READABLE MEDIUM 1120
INSTRUCTIONS 1110
1140
BUS
I/O COMPONENTS
1102
1126
1128
1130
USER OUTPUT
USER INPUT
BIOMETRIC
MOTION
ENVIRONMENT
POSITION
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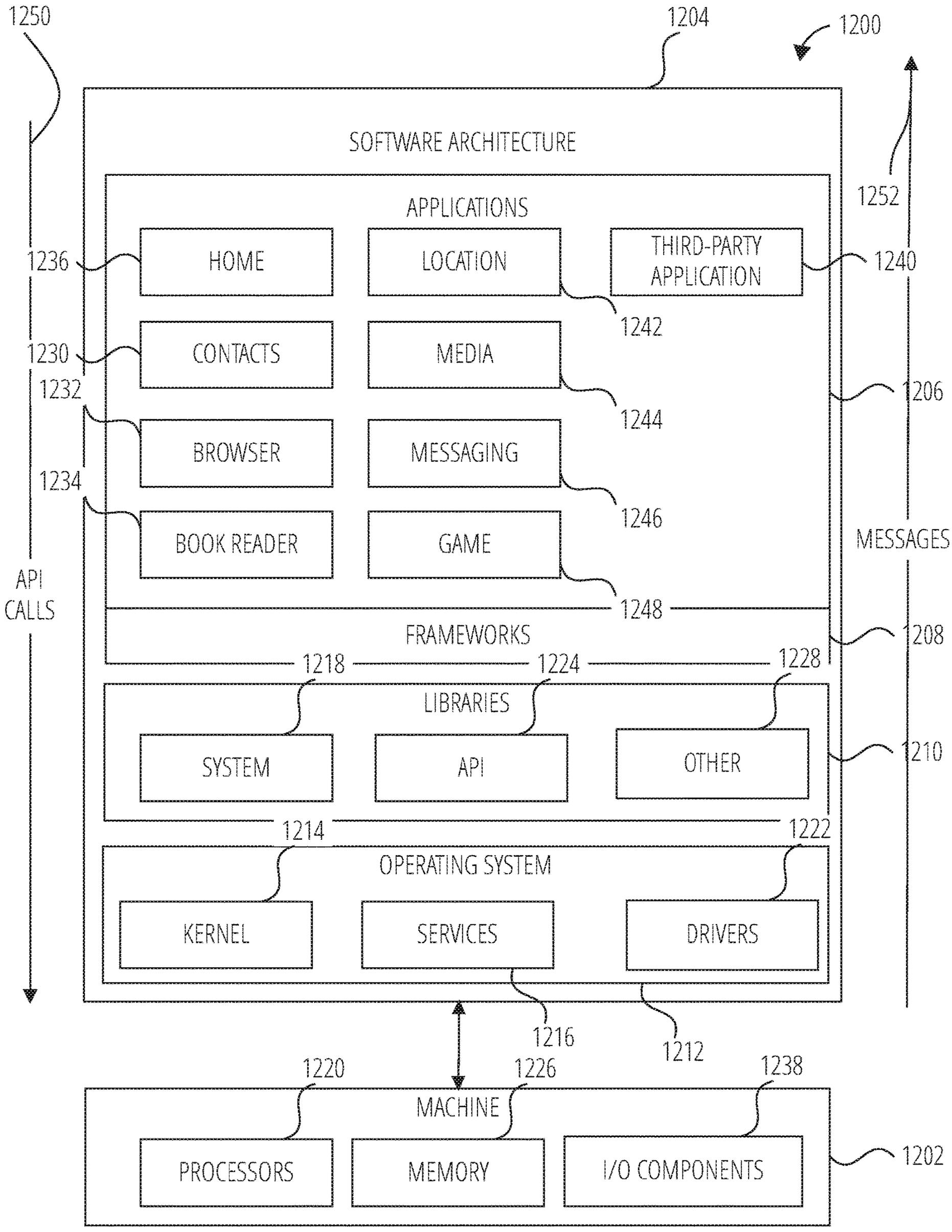
1134
1136
COMMUNICATION 1138
1124
DEVICES
1122
NETWORK

FIG. 11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1204
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SOFTWARE ARCHITECTURE
APPLICATIONS
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LOCATION
THIRD-PARTY APPLICATION
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CONTACTS
MEDIA
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1206
1244
BROWSER
MESSAGING
1234
1246
BOOK READER
GAME
MESSAGES
API CALLS
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FRAMEWORKS
1208
1218
1224
1228
LIBRARIES
SYSTEM
API
OTHER
1210
1214
1222
OPERATING SYSTEM
KERNEL
SERVICES
DRIVERS
1216
1212
1220
1226
1238
MACHINE
PROCESSORS
MEMORY
I/O COMPONENTS
1202

FIG. 12

PRESENTING AVAILABLE AUGMENTED REALITY CONTENT ITEMS IN ASSOCIATION WITH MULTI-VIDEO CLIP CAPTURE

CROSS-REFERENCE TO RELATED APPLICATION

This patent application claims the benefit of U.S. Provisional Patent Application No. 63/132,294, filed Dec. 30, 2020, entitled "PRESENTING AVAILABLE AUGMENTED REALITY CONTENT ITEMS IN ASSOCIATION WITH MULTI-VIDEO CLIP CAPTURE", which is incorporated by reference herein in its entirety.

TECHNICAL FIELD

The present disclosure relates generally to a messaging system, including presenting available augmented reality content items (e.g., Lenses) in association with multi-video clip capture within a messaging system.

BACKGROUND

Messaging systems provide for the exchange of message content between users. For example, a messaging system allows a user to exchange message content (e.g., text, images) with one or more other users.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

In the drawings, which are not necessarily drawn to scale, like numerals may describe similar components in different views. To easily identify the discussion of any particular element or act, the most significant digit or digits in a reference number refer to the figure number in which that element is first introduced. Some nonlimiting examples are illustrated in the figures of the accompanying drawings in which:

FIG. **1** is a diagrammatic representation of a networked environment in which the present disclosure may be deployed, in accordance with some examples.

FIG. **2** is a diagrammatic representation of a messaging system, in accordance with some examples, that has both client-side and server-side functionality.

FIG. **3** is a diagrammatic representation of a data structure as maintained in a database, in accordance with some examples.

FIG. **4** is a diagrammatic representation of a message, in accordance with some examples.

FIG. **5** is a diagram illustrating a user interface arrangement configured to capture, combine and preview multiple video clips, in accordance with some example embodiments.

FIGS. **6**A-**6**E illustrate a user interface configured to capture multiple video clips for including into a media content item, in accordance with some example embodiments.

FIG. **7** illustrates a user interface for previewing multiple video clips for combining into a media content item, in accordance with some example embodiments.

FIGS. **8**A-**8**C illustrate switching between a carousel interface and explorer interface for selecting augmented reality content items in association with multi-video clip capture, in accordance with some example embodiments.

FIG. **9** is a flowchart illustrating a process for presenting available augmented reality content items in association with multi-video clip capture, in accordance with some example embodiments.

FIG. **10** is a flowchart for an access-limiting process, in accordance with some examples.

FIG. **11** is a diagrammatic representation of a machine in the form of a computer system within which a set of instructions may be executed for causing the machine to perform any one or more of the methodologies discussed herein, in accordance with some examples.

FIG. **12** is a block diagram showing a software architecture within which examples may be implemented.

DETAILED DESCRIPTION

A messaging system typically allow users to exchange content items (e.g., messages, images and/or video) with one another in a message thread. A messaging system may implement one or more content feeds for surfacing media content to end users.

The disclosed embodiments provide for a messaging system to include different user interfaces for presenting available augmented reality content items (e.g., Lenses) in association with a multi-video clip camera mode. The camera mode corresponds with capturing multiple video clips which are combinable to generate a media content item (e.g., for sending to a friend, broadcasting to others, etc.).

The user interfaces for presenting available augmented reality content items include a carousel interface and an explorer user interface. The carousel interface presents a first set of available augmented reality content items while the device is capturing video in the multi-video clip camera mode. The explorer user interface is a separate interface with a tile view for presenting a second set of available augmented reality content items. In a case where the user selects an augmented reality content item via the explorer user interface, the messaging system stores an indication of the selected augmented reality content item. The stored indication is usable to persistently present the selected augmented reality content item within the carousel interface, for example, until the session for multi-video clip capture is complete. Indications for position within the tiled view and text-based searching via the explorer user interface may also be stored for persistence between user interfaces, until the session is complete.

FIG. **1** is a block diagram showing an example messaging system **100** for exchanging data (e.g., messages and associated content) over a network. The messaging system **100** includes multiple instances of a client device **102**, each of which hosts a number of applications, including a messaging client **104** and other applications **106**. Each messaging client **104** is communicatively coupled to other instances of the messaging client **104** (e.g., hosted on respective other client devices **102**), a messaging server system **108** and third-party servers **110** via a network **112** (e.g., the Internet) A messaging client **104** can also communicate with locally-hosted applications **106** using Applications Program Interfaces (APIs).

A messaging client **104** is able to communicate and exchange data with other messaging clients **104** and with the messaging server system **108** via the network **112**. The data exchanged between messaging clients **104**, and between a messaging client **104** and the messaging server system **108**, includes functions (e.g., commands to invoke functions) as well as payload data (e.g., text, audio, video or other multimedia data).

The messaging server system **108** provides server-side functionality via the network **112** to a particular messaging client **104**. While certain functions of the messaging system **100** are described herein as being performed by either a messaging client **104** or by the messaging server system **108**, the location of certain functionality either within the messaging client **104** or the messaging server system **108** may be a design choice. For example, it may be technically preferable to initially deploy certain technology and functionality within the messaging server system **108** but to later migrate this technology and functionality to the messaging client **104** where a client device **102** has sufficient processing capacity.

The messaging server system **108** supports various services and operations that are provided to the messaging client **104**. Such operations include transmitting data to, receiving data from, and processing data generated by the messaging client **104**. This data may include message content, client device information, geolocation information, media augmentation and overlays, message content persistence conditions, social network information, and live event information, as examples. Data exchanges within the messaging system **100** are invoked and controlled through functions available via user interfaces (UIs) of the messaging client **104**.

Turning now specifically to the messaging server system **108**, an Application Program Interface (API) server **116** is coupled to, and provides a programmatic interface to, application servers **114**. The application servers **114** are communicatively coupled to a database server **120**, which facilitates access to a database **126** that stores data associated with messages processed by the application servers **114**. Similarly, a web server **128** is coupled to the application servers **114**, and provides web-based interfaces to the application servers **114**. To this end, the web server **128** processes incoming network requests over the Hypertext Transfer Protocol (HTTP) and several other related protocols.

The Application Program Interface (API) server **116** receives and transmits message data (e.g., commands and message payloads) between the client device **102** and the application servers **114**. Specifically, the Application Program Interface (API) server **116** provides a set of interfaces (e.g., routines and protocols) that can be called or queried by the messaging client **104** in order to invoke functionality of the application servers **114**. The Application Program interface (API) server **116** exposes various functions supported by the application servers **114**, including account registration, login functionality, the sending of messages, via the application servers **114**, from a particular messaging client **104** to another messaging client **104**, the sending of media files (e.g., images or video) from a messaging client **104** to a messaging server **118**, and for possible access by another messaging client **104**, the settings of a collection of media data (e.g., story), the retrieval of a list of friends of a user of a client device **102**, the retrieval of such collections, the retrieval of messages and content, the addition and deletion of entities (e.g., friends) to an entity graph (e.g., a social graph), the location of friends within a social graph, and opening an application event (e.g., relating to the messaging client **104**).

The application servers **114** host a number of server applications and subsystems, including for example a messaging server **118**, an image processing server **122**, and a social network server **124**. The messaging server **118** implements a number of message processing technologies and functions, particularly related to the aggregation and other processing of content (e.g., textual and multimedia content) included in messages received from multiple instances of the messaging client **104**. As will be described in further detail, the text and media content from multiple sources may be aggregated into collections of content (e.g., called stories or galleries). These collections are then made available to the messaging client **104**. Other processor and memory intensive processing of data may also be performed server-side by the messaging server **118**, in view of the hardware requirements for such processing.

The application servers **114** also include an image processing server **122** that is dedicated to performing various image processing operations, typically with respect to images or video within the payload of a message sent from or received at the messaging server **118**.

The social network server **124** supports various social networking functions and services and makes these functions and services available to the messaging server **118**. To this end, the social network server **124** maintains and accesses an entity graph **304** (as shown in FIG. **3**) within the database **126**. Examples of functions and services supported by the social network server **124** include the identification of other users of the messaging system **100** with which a particular user has relationships or is "following," and also the identification of other entities and interests of a particular user.

Returning to the messaging client **104**, features and functions of an external resource (e.g., an application **106** or apples) are made available to a user via an interface of the messaging client **104**. In this context, "external" refers to the fact that the application **106** or applet is external to the messaging client **104**. The external resource is often provided by a third party but may also be provided by the creator or provider of the messaging client **104**. The messaging client **104** receives a user selection of an option to launch or access features of such an external resource. The external resource may be the application **106** installed on the client device **102** (e.g., a "native app"), or a small-scale version of the application (e.g., an "applet") that is hosted on the client device **102** or remote of the client device **102** (e.g., on third-party servers **110**). The small-scale version of the application includes a subset of features and functions of the application (e.g., the full-scale, native version of the application) and is implemented using a markup-language document. In one example, the small-scale version of the application (e.g., an "applet") is a web-based, markup-language version of the application and is embedded in the messaging client **104**. In addition to using markup-language documents (e.g., a .*ml file), an applet may incorporate a scripting language (e.g., a .*js file or a .json file) and a style sheet (e.g., a .*ss file).

In response to receiving a user selection of the option to launch or access features of the external resource, the messaging client **104** determines whether the selected external resource is a web-based external resource or a locally-installed application **106**. In some cases, applications **106** that are locally installed on the client device **102** can be launched independently of and separately from the messaging client **104**, such as by selecting an icon, corresponding to the application **106**, on a home screen of the client device **102**. Small-scale versions of such applications can be launched or accessed via the messaging client **104** and, in some examples, no or limited portions of the small-scale application can be accessed outside of the messaging client **104**. The small-scale application can be launched by the messaging client **104** receiving, from a third-party server

110 for example, a markup-language document associated with the small-scale application and processing such a document.

In response to determining that the external resource is a locally-installed application **106**, the messaging client **104** instructs the client device **102** to launch the external resource by executing locally-stored code corresponding to the external resource. In response to determining that the external resource is a web-based resource, the messaging client **104** communicates with the third-party servers **110** (for example) to obtain a markup-language document corresponding to the selected external resource. The messaging client **104** then processes the obtained markup-language document to present the web-based external resource within a user interface of the messaging client **104**.

The messaging client **104** can notify a user of the client device **102**, or other users related to such a user (e.g., "friends"), of activity taking place in one or more external resources. For example, the messaging client **104** can provide participants in a conversation (e.g., a chat session) in the messaging client **104** with notifications relating to the current or recent use of an external resource by one or more members of a group of users. One or more users can be invited to join in an active external resource or to launch a recently-used but currently inactive (in the group of friends) external resource. The external resource can provide participants in a conversation, each using respective messaging clients **104**, with the ability to share an item, status, state, or location in an external resource with one or more members of a group of users into a chat session. The shared item may be an interactive chat card with which members of the chat can interact, for example, to launch the corresponding external resource, view specific information within the external resource, or take the member of the chat to a specific location or state within the external resource. Within a given external resource, response messages can be sent to users on the messaging client **104**. The external resource can selectively include different media items in the responses, based on a current context of the external resource.

The messaging client **104** can present a list of the available external resources (e.g., applications **106** or applets) to a user to launch or access a given external resource. This list can be presented in a context-sensitive menu. For example, the icons representing different ones of the application **106** (or applets) can vary based on how the menu is launched by the user (e.g., from a conversation interface or from a non-conversation interface).

FIG. **2** is a block diagram illustrating further details regarding the messaging system **100**, according to some examples. Specifically, the messaging system **100** is shown to comprise the messaging client **104** and the application servers **114**. The messaging system **100** embodies a number of subsystems, which are supported on the client-side by the messaging client **104** and on the sever-side by the application servers **114**. These subsystems include, for example, an ephemeral timer system **202**, a collection management system **204**, an augmentation system **208**, a map system **210**, an external resource system **212**, and a camera mode system **214**.

The ephemeral timer system **202** is responsible for enforcing the temporary or time-limited access to content by the messaging client **104** and the messaging server **118**. The ephemeral timer system **202** incorporates a number of timers that, based on duration and display parameters associated with a message, or collection of messages (e.g., a story), selectively enable access (e.g., for presentation and display) to messages and associated content via the messaging client **104**. Further details regarding the operation of the ephemeral timer system **202** are provided below.

The collection management system **204** is responsible for managing sets or collections of media (e.g., collections of text, image video, and audio data). A collection of content (e.g., messages, including images, video, text, and audio) may be organized into an "event gallery" or an "event story." Such a collection may be made available for a specified time period, such as the duration of an event to which the content relates. For example, content relating to a music concert may be made available as a "story" for the duration of that music concert. The collection management system **204** may also be responsible for publishing an icon that provides notification of the existence of a particular collection to the user interface of the messaging client **104**.

The collection management system **204** furthermore includes a curation interface **206** that allows a collection manager to manage and curate a particular collection of content. For example, the curation interface **206** enables an event organizer to curate a collection of content relating to a specific event (e.g., delete inappropriate content or redundant messages). Additionally, the collection management system **204** employs machine vision (or image recognition technology) and content rules to automatically curate a content collection. In certain examples, compensation may be paid to a user for the inclusion of user-generated content into a collection. In such cases, the collection management system **204** operates to automatically make payments to such users for the use of their content.

The augmentation system **208** provides various functions that enable a user to augment (e.g., annotate or otherwise modify or edit) media content associated with a message. For example, the augmentation system **208** provides functions related to the generation and publishing of media overlays for messages processed by the messaging system **100**. The augmentation system **208** operatively supplies a media overlay or augmentation (e.g., an image filter) to the messaging client **104** based on a geolocation of the client device **102**. In another example, the augmentation system **208** operatively supplies a media overlay to the messaging client **104** based on other information, such as social network information of the user of the client device **102**. A media overlay may include audio and visual content and visual effects. Examples of audio and visual content include pictures, texts, logos, animations, and sound effects. An example of a visual effect includes color overlaying. The audio and visual content or the visual effects can be applied to a media content item (e.g., a photo) at the client device **102**. For example, the media overlay may include text or image that can be overlaid on top of a photograph taken by the client device **102**. In another example, the media overlay includes an identification of a location overlay (e.g., Venice beach), a name of a live event, or a name of a merchant overlay (e.g., Beach Coffee House). In another example, the augmentation system **208** uses the geolocation of the client device **102** to identify a media overlay that includes the name of a merchant at the geolocation of the client device **102**. The media overlay may include other indicia associated with the merchant. The media overlays may be stored in the database **126** and accessed through the database server **120**.

In some examples, the augmentation system **208** provides a user-based publication platform that enables users to select a geolocation on a map and upload content associated with the selected geolocation. The user may also specify circumstances under which a particular media overlay should be offered to other users. The augmentation system **208** gen-

erates a media overlay that includes the uploaded content and associates the uploaded content with the selected geolocation.

In other examples, the augmentation system **208** provides a merchant-based publication platform that enables merchants to select a particular media overlay associated with a geolocation via a bidding process. For example, the augmentation system **208** associates the media overlay of the highest bidding merchant with a corresponding geolocation for a predefined amount of time.

In other examples, as discussed below with respect to FIG. **3**, the augmentation system **208** provides for presenting augmented reality content in association with an image or a video captured by a camera of the client device **102**. The augmentation system **208** may implement or otherwise access augmented reality content items (e.g., corresponding to applying Lenses or augmented reality experiences) for providing real-time special effect(s) and/or sound(s) that may be added to the image or video. To facilitate the presentation of augmented reality content, the augmentation system **208** may implement or otherwise access object recognition algorithms (e.g., including machine learning algorithms) configured to scan an image or video, and to detect/track the movement of objects within the image or video.

The map system **210** provides various geographic location functions, and supports the presentation of map-based media content and messages by the messaging client **104**. For example, the map system **210** enables the display of user icons or avatars (e.g., stored in profile data **302**) on a map to indicate a current or past location of "friends" of a user, as well as media content (e.g., collections of messages including photographs and videos) generated by such friends, within the context of a map. For example, a message posted by a user to the messaging system **100** from a specific geographic location may be displayed within the context of a map at that particular location to "friends" of a specific user on a map interface of the messaging client **104**. A user can furthermore share his or her location and status information (e.g., using an appropriate status avatar) with other users of the messaging system **100** via the messaging client **104**, with this location and status information being similarly displayed within the context of a map interface of the messaging client **104** to selected users.

The external resource system **212** provides an interface for the messaging client **104** to communicate with remote servers (e.g. third-party servers **110**) to launch or access external resources, i.e. applications or applets. Each third-party server **110** hosts, for example, a markup language (e.g., HTML5) based application or small-scale version of an application (e.g., game, utility, payment, or ride-sharing application). The messaging client **104** may launches a web-based resource (e.g., application) by accessing the HTML5 file from the third-party servers **110** associated with the web-based resource. In certain examples, applications hosted by third-party servers **110** are programmed in JavaScript leveraging a Software Development Kit (SDK) provided by the messaging server **118**. The SDK includes Application Programming Interfaces (APIs) with functions that can be called or invoked by the web-based application. In certain examples, the messaging server **118** includes a JavaScript library that provides a given external resource access to certain user data of the messaging client **104**. HTML5 is used as an example technology for programming games, but applications and resources programmed based on other technologies can be used.

In order to integrate the functions of the SDK into the web-based resource, the SDK is downloaded by a third-party server **110** from the messaging server **118** or is otherwise received by the third-party server **110**. Once downloaded or received, the SDK is included as part of the application code of a web-based external resource. The code of the web-based resource can then call or invoke certain functions of the SDK to integrate features of the messaging client **104** into the web-based resource.

The SDK stored on the messaging server **118** effectively provides the bridge between an external resource (e.g., applications **106** or applets and the messaging client **104**. This provides the user with a seamless experience of communicating with other users on the messaging client **104**, while also preserving the look and feel of the messaging client **104**. To bridge communications between an external resource and a messaging client **104**, in certain examples, the SDK facilitates communication between third-party servers **110** and the messaging client **104**. In certain examples, a Web ViewJavaScriptBridge running on a client device **102** establishes two one-way communication channels between an external resource and the messaging client **104**. Messages are sent between the external resource and the messaging client **104** via these communication channels asynchronously. Each SDK function invocation is sent as a message and callback. Each SDK function is implemented by constructing a unique callback identifier and sending a message with that callback identifier.

By using the SDK, not all information from the messaging client **104** is shared with third-party servers **110**. The SDK limits which information is shared based on the needs of the external resource. In certain examples, each third-party server **110** provides an HTML5 file corresponding to the web-based external resource to the messaging server **118**. The messaging server **118** can add a visual representation (such as a box art or other graphic) of the web-based external resource in the messaging client **104**. Once the user selects the visual representation or instructs the messaging client **104** through a GUI of the messaging client **104** to access features of the web-based external resource, the messaging client **104** obtains the HTML5 file and instantiates the resources necessary to access the features of the web-based external resource.

The messaging client **104** presents a graphical user interface (e.g., a landing page or title screen) for an external resource. During, before, or after presenting the landing page or title screen, the messaging client **104** determines whether the launched external resource has been previously authorized to access user data of the messaging client **104**. In response to determining that the launched external resource has been previously authorized to access user data of the messaging client **104**, the messaging client **104** presents another graphical user interface of the external resource that includes functions and features of the external resource. In response to determining that the launched external resource has not been previously authorized to access user data of the messaging client **104**, after a threshold period of time (e.g., 3 seconds) of displaying the landing page or title screen of the external resource, the messaging client **104** slides up (e.g., animates a menu as surfacing from a bottom of the screen to a middle of or other portion of the screen) a menu for authorizing the external resource to access the user data. The menu identifies the type of user data that the external resource will be authorized to use. In response to receiving a user selection of an accept option, the messaging client **104** adds the external resource to a list of authorized external resources and allows the external

resource to access user data from the messaging client **104**. In some examples, the external resource is authorized by the messaging client **104** to access the user data in accordance with an OAuth 2 framework.

The messaging client **104** controls the type of user data that is shared with external resources based on the type of external resource being authorized. For example, external resources that include full-scale applications (e.g., an application **106**) are provided with access to a first type of user data (e.g., only two-dimensional avatars of users with or without different avatar characteristics). As another example, external resources that include small-scale versions of applications (e.g., web-based versions of applications) are provided with access to a second type of user data (e.g., payment information, two-dimensional avatars of users, three-dimensional avatars of users, and avatars with various avatar characteristics). Avatar characteristics include different ways to customize a look and feel of an avatar, such as different poses, facial features, clothing, and so forth.

The camera mode system **214** implements various functions for providing different camera modes within the context of the messaging system **100**. For example, the camera mode system **214** provides for first and second camera modes, and for providing the user with the option to select between the first and second camera modes. The first camera mode corresponds with capturing a single video clip in order to generate a media content item. The camera mode system **214** provides a second camera mode for capturing multiple videos for combining to generate the media content item. In addition, the camera mode system **214** is configured to adjust user interfaces (e.g., a capture user interface for capturing video clip(s) and/or a preview user interface for previewing captured video clip(s)) based on which camera mode is enabled.

FIG. **3** is a schematic diagram illustrating data structures **300**, which may be stored in the database **126** of the messaging server system **108**, according to certain examples. While the content of the database **126** is shown to comprise a number of tables, it will be appreciated that the data could be stored in other types of data structures (e.g., as an object-oriented database).

The database **126** includes message data stored within a message table **306**. This message data includes, for any particular one message, at least message sender data, message recipient (or receiver) data, and a payload. Further details regarding information that may be included in a message, and included within the message data stored in the message table **306** is described below with reference to FIG. **4**.

An entity table **308** stores entity data, and is linked (e.g., referentially) to an entity graph **304** and profile data **302**. Entities for which records are maintained within the entity table **308** may include individuals, corporate entities, organizations, objects, places, events, and so forth. Regardless of entity type, any entity regarding which the messaging server system **108** stores data may be a recognized entity. Each entity is provided with a unique identifier, as well as an entity type identifier (not shown).

The entity graph **304** stores information regarding relationships and associations between entities. Such relationships may be social, professional (e.g., work at a common corporation or organization) interested-based or activity-based, merely for example.

The profile data **302** stores multiple types of profile data about a particular entity. The profile data **302** may be selectively used and presented to other users of the messaging system **100**, based on privacy settings specified by a particular entity. Where the entity is an individual, the profile data **302** includes, for example, a user name, telephone number, address, settings (e.g., notification and privacy settings), as well as a user-selected avatar representation (or collection of such avatar representations). A particular user may then selectively include one or more of these avatar representations within the content of messages communicated via the messaging system **100**, and on map interfaces displayed by messaging clients **104** to other users. The collection of avatar representations may include "status avatars," which present a graphical representation of a status or activity that the user may select to communicate at a particular time.

Where the entity is a group, the profile data **302** for the group may similarly include one or more avatar representations associated with the group, in addition to the group name, members, and various settings (e.g., notifications) for the relevant group.

The database **126** also stores augmentation data, such as overlays or filters, in an augmentation table **310**. The augmentation data is associated with and applied to videos (for which data is stored in a video table **314**) and images (for which data is stored in an image table **316**).

Filters, in one example, are overlays that are displayed as overlaid on an image or video during presentation to a recipient user. Filters may be of various types, including user-selected filters from a set of filters presented to a sending user by the messaging client **104** when the sending user is composing a message. Other types of filters include geolocation filters (also known as geo-filters), which may be presented to a sending user based on geographic location. For example, geolocation filters specific to a neighborhood or special location may be presented within a user interface by the messaging client **104**, based on geolocation information determined by a Global Positioning System (GPS) unit of the client device **102**.

Another type of filter is a data filter, which may be selectively presented to a sending user by the messaging client **104**, based on other inputs or information gathered by the client device **102** during the message creation process. Examples of data filters include current temperature at a specific location, a current speed at which a sending user is traveling, battery life for a client device **102**, or the current time.

Other augmentation data that may be stored within the image table **316** includes augmented reality content items (e.g., corresponding to applying Lenses or augmented reality experiences). An augmented reality content item may provide a real-time special effect and/or sound that may be added to an image or a video.

As described above, augmentation data includes augmented reality content items, overlays, image transformations, AR images, and similar terms refer to modifications that may be applied to image data (e.g., videos or images). This includes real-time modifications, which modify an image as it is captured using device sensors (e.g., one or multiple cameras) of a client device **102** and then displayed on a screen of the client device **102** with the modifications. This also includes modifications to stored content, such as video clips in a gallery that may be modified. For example, in a client device **102** with access to multiple augmented reality content items, a user can use a single video clip with multiple augmented reality content items to see how the different augmented reality content items will modify the stored clip. For example, multiple augmented reality content items that apply different pseudorandom movement models can be applied to the same content by selecting different

augmented reality content items for the content. Similarly, real-time video capture may be used with an illustrated modification to show how video images currently being captured by sensors of a client device **102** would modify the captured data. Such data may simply be displayed on the screen and not stored in memory, or the content captured by the device sensors may be recorded and stored in memory with or without the modifications (or both). In some systems, a preview feature can show how different augmented reality content items will look within different windows in a display at the same time. This can, for example, enable multiple windows with different pseudorandom animations to be viewed on a display at the same time.

Data and various systems using augmented reality content items or other such transform systems to modify content using this data can thus involve detection of objects (e.g., faces, hands, bodies, cats, dogs, surfaces, objects, etc.), tracking of such objects as they leave, enter, and move around the field of view in video frames, and the modification or transformation of such objects as they are tracked. In various examples, different methods for achieving such transformations may be used. Some examples may involve generating a three-dimensional mesh model of the object or objects, and using transformations and animated textures of the model within the video to achieve the transformation. In other examples, tracking of points on an object may be used to place an image or texture (which may be two dimensional or three dimensional) at the tracked position. In still further examples, neural network analysis of video frames may be used to place images, models, or textures in content (e.g., images or frames of video). Augmented reality content items thus refer both to the images, models, and textures used to create transformations in content, as well as to additional modeling and analysis information needed to achieve such transformations with object detection, tracking, and placement.

Real-time video processing can be performed with any kind of video data (e.g., video streams, video files, etc.) saved in a memory of a computerized system of any kind. For example, a user can load video files and save them in a memory of a device, or can generate a video stream using sensors of the device. Additionally, any objects can be processed using a computer animation model, such as a human's face and parts of a human body, animals, or non-living things such as chairs, cars, or other objects.

In some examples, when a particular modification is selected along with content to be transformed, elements to be transformed are identified by the computing device, and then detected and tracked if they are present in the frames of the video. The elements of the object are modified according to the request for modification, thus transforming the frames of the video stream. Transformation of frames of a video stream can be performed by different methods for different kinds of transformation. For example, for transformations of frames mostly referring to changing forms of object's elements characteristic points for each element of an object are calculated (e.g., using an Active Shape Model (ASM) or other known methods). Then, a mesh based on the characteristic points is generated for each of the at least one element of the object. This mesh used in the following stage of tracking the elements of the object in the video stream. In the process of tracking, the mentioned mesh for each element is aligned with a position of each element. Then, additional points are generated on the mesh. A first set of first points is generated for each element based on a request for modification, and a set of second points is generated for each element based on the set of first points and the request for modification. Then, the frames of the video stream can be transformed by modifying the elements of the object on the basis of the sets of first and second points and the mesh. In such method, a background of the modified object can be changed or distorted as well by tracking and modifying the background.

In some examples, transformations changing some areas of an object using its elements can be performed by calculating characteristic points for each element of an object and generating a mesh based on the calculated characteristic points. Points are generated on the mesh, and then various areas based on the points are generated. The elements of the object are then tracked by aligning the area for each element with a position for each of the at least one element, and properties of the areas can be modified based on the request for modification, thus transforming the frames of the video stream. Depending on the specific request for modification properties of the mentioned areas can be transformed in different ways. Such modifications may involve changing color of areas; removing at least some part of areas from the frames of the video stream; including one or more new objects into areas which are based on a request for modification; and modifying or distorting the elements of an area or object. In various examples, any combination of such modifications or other similar modifications may be used. For certain models to be animated, some characteristic points can be selected as control points to be used in determining the entire state-space of options for the model animation.

In some examples of a computer animation model to transform image data using face detection, the face is detected on an image with use of a specific face detection algorithm (e.g., Viola-Jones). Then, an Active Shape Model (ASM) algorithm is applied to the face region of an image to detect facial feature reference points.

Other methods and algorithms suitable for face detection can be used. For example, in some examples, features are located using a landmark, which represents a distinguishable point present in most of the images under consideration. For facial landmarks, for example, the location of the left eye pupil may be used. If an initial landmark is not identifiable (e.g., if a person has an eyepatch), secondary landmarks may be used. Such landmark identification procedures may be used for any such objects. In some examples, a set of landmarks forms a shape. Shapes can be represented as vectors using the coordinates of the points in the shape. One shape is aligned to another with a similarity transform (allowing translation, scaling, and rotation) that minimizes the average Euclidean distance between shape points. The mean shape is the mean of the aligned training shapes.

In some examples, a search for landmarks from the mean shape aligned to the position and size of the face determined by a global face detector is started. Such a search then repeats the steps of suggesting a tentative shape by adjusting the locations of shape points by template matching of the image texture around each point and then conforming the tentative shape to a global shape model until convergence occurs. In some systems, individual template matches are unreliable, and the shape model pools the results of the weak template matches to form a stronger overall classifier. The entire search is repeated at each level in an image pyramid, from coarse to fine resolution.

A transformation system can capture an image or video stream on a client device (e.g., the client device **102**) and perform complex image manipulations locally on the client device **102** while maintaining a suitable user experience, computation time, and power consumption. The complex

image manipulations may include size and shape changes, emotion transfers (e.g., changing a face from a frown to a smile), state transfers (e.g., aging a subject, reducing apparent age, changing gender), style transfers, graphical element application, and any other suitable image or video manipulation implemented by a convolutional neural network that has been configured to execute efficiently on the client device **102**.

In some examples, a computer animation model to transform image data can be used by a system where a user may capture an image or video stream of the user (e.g., a selfie) using a client device **102** having a neural network operating as part of a messaging client **104** operating on the client device **102**. The transformation system operating within the messaging client **104** determines the presence of a face within the image or video stream and provides modification icons associated with a computer animation model to transform image data, or the computer animation model can be present as associated with an interface described herein. The modification icons include changes that may be the basis for modifying the user's face within the image or video stream as part of the modification operation. Once a modification icon is selected, the transform system initiates a process to convert the image of the user to reflect the selected modification icon (e.g., generate a smiling face on the user). A modified image or video stream may be presented in a graphical user interface displayed on the client device **102** as soon as the image or video stream is captured, and a specified modification is selected. The transformation system may implement a complex convolutional neural network on a portion of the image or video stream to generate and apply the selected modification. That is, the user may capture the image or video stream and be presented with a modified result in real-time or near real-time once a modification icon has been selected. Further, the modification may be persistent while the video stream is being captured, and the selected modification icon remains toggled. Machine taught neural networks may be used to enable such modifications.

The graphical user interface, presenting the modification performed by the transform system, may supply the user with additional interaction options. Such options may be based on the interface used to initiate the content capture and selection of a particular computer animation model (e.g., initiation from a content creator user interface). In various examples, a modification may be persistent after an initial selection of a modification icon. The user may toggle the modification on or off by tapping or otherwise selecting the face being modified by the transformation system and store it for later viewing or browse to other areas of the imaging application. Where multiple faces are modified by the transformation system, the user may toggle the modification on or off globally by tapping or selecting a single face modified and displayed within a graphical user interface. In some examples, individual faces, among a group of multiple faces, may be individually modified, or such modifications may be individually toggled by tapping or selecting the individual face or a series of individual faces displayed within the graphical user interface.

A story table **312** stores data regarding collections of messages and associated image, video, or audio data, which are compiled into a collection (e.g., a story or a gallery). The creation of a particular collection may be initiated by a particular user (e.g., each user for which a record is maintained in the entity table **308**). A user may create a "personal story" in the form of a collection of content that has been created and sent/broadcast by that user. To this end, the user interface of the messaging client **104** may include an icon that is user-selectable to enable a sending user to add specific content to his or her personal story.

A collection may also constitute a "live story," which is a collection of content from multiple users that is created manually, automatically, or using a combination of manual and automatic techniques. For example, a "live story" may constitute a curated stream of user-submitted content from varies locations and events. Users whose client devices have location services enabled and are at a common location event at a particular time may, for example, be presented with an option, via a user interface of the messaging client **104**, to contribute content to a particular live story. The live story may be identified to the user by the messaging client **104**, based on his or her location. The end result is a "live story" told from a community perspective.

A further type of content collection is known as a "location story," which enables a user whose client device **102** is located within a specific geographic location (e.g., on a college or university campus) to contribute to a particular collection. In some examples, a contribution to a location story may require a second degree of authentication to verify that the end user belongs to a specific organization or other entity (e.g., is a student on the university campus).

As mentioned above, the video table **314** stores video data that, in one example, is associated with messages for which records are maintained within the message table **306**. Similarly, the image table **316** stores image data associated with messages for which message data is stored in the entity table **308**. The entity table **308** may associate various augmentations from the augmentation table **310** with various images and videos stored in the image table **316** and the video table **314**.

FIG. **4** is a schematic diagram illustrating a structure of a message **400**, according to some examples, generated by a messaging client **104** for communication to a further messaging client **104** or the messaging server **118**. The content of a particular message **400** is used to populate the message table **306** stored within the database **126**, accessible by the messaging server **118**. Similarly, the content of a message **400** is stored in memory as "in-transit" or "in-flight" data of the client device **102** or the application servers **114**. A message **400** is shown to include the following example components:

message identifier **402**: a unique identifier that identifies the message **400**.

message text payload **404**: text, to be generated by a user via a user interface of the client device **102**, and that is included in the message **400**.

message image payload **406**: image data, captured by a camera component of a client device **102** or retrieved from a memory component of a client device **102**, and that is included in the message **400**. Image data for a sent or received message **400** may be stored in the image table **316**.

message video payload **408**: video data, captured by a camera component or retrieved from a memory component of the client device **102**, and that is included in the message **400**. Video data for a sent or received message **400** may be stored in the video table **314**.

message audio payload **410**: audio data, captured by a microphone or retrieved from a memory component of the client device **102**, and that is included in the message **400**.

message augmentation data **412**: augmentation data (e.g., filters, stickers, or other annotations or enhancements) that represents augmentations to be applied to message

image payload **406**, message video payload **408**, or message audio payload **410** of the message **400**. Augmentation data for a sent or received message **400** may be stored in the augmentation table **310**.

message duration parameter **414**: parameter value indicating, in seconds, the amount of time for which content of the message (e.g., the message image payload **406**, message video payload **408**, message audio payload **410**) is to be presented or made accessible to a user via the messaging client **104**.

message geolocation parameter **416**: geolocation data (e.g., latitudinal and longitudinal coordinates) associated with the content payload of the message. Multiple message geolocation parameter **416** values may be included in the payload, each of these parameter values being associated with respect to content items included in the content (e.g., a specific image into within the message image payload **406**, or a specific video in the message video payload **408**).

message story identifier **418**: identifier values identifying one or more content collections (e.g., "stories" identified in the story table **312**) with which a particular content item in the message image payload **406** of the message **400** is associated. For example, multiple images within the message image payload **406** may each be associated with multiple content collections using identifier values.

message tag **420**: each message **400** may be tagged with multiple tags, each of which is indicative of the subject matter of content included in the message payload. For example, where a particular image included in the message image payload **406** depicts an animal (e.g., a lion), a tag value may be included within the message tag **420** that is indicative of the relevant animal. Tag values may be generated manually, based on user input, or may be automatically generated using, for example, image recognition.

message sender identifier **422**: an identifier (e.g., a messaging system identifier, email address, or device identifier) indicative of a user of the Client device **102** on which the message **400** was generated and from which the message **400** was sent.

message receiver identifier **424**: an identifier (e.g., a messaging system identifier, email address, or device identifier) indicative of a user of the client device **102** to which the message **400** is addressed.

The contents (e.g., values) of the various components of message **400** may be pointers to locations in tables within which content data values are stored. For example, an image value in the message image payload **406** may be a pointer to (or address of) a location within an image table **316**. Similarly, values within the message video payload **408** may point to data stored within a video table **314**, values stored within the message augmentations **412** may point to data stored in an augmentation table **310**, values stored within the message story identifier **418** may point to data stored in a story table **312**, and values stored within the message sender identifier **422** and the message receiver identifier **424** may point to user records stored within an entity table **308**.

FIG. **5** is a diagram illustrating a user interface arrangement **500** configured to capture, combine and preview multiple video clips, in accordance with some example embodiments. For explanatory purposes, the user interface arrangement **500** is primarily described herein with reference to the messaging client **104** of FIG. **1**, and the camera mode system **214** of FIG. **2**. Not all of the depicted and described interfaces/components may be used in all implementations, and one or more embodiments may include additional or different interfaces/components than those shown and described with respect to the figure. Variations in the arrangement and type of the interfaces/components may be made without departing from the spirit or scope of the claims as set forth herein.

The user interface arrangement **500** may be implemented at least in part by the camera mode system **214**. As noted above, the camera mode system **214** may correspond to a subsystem of the messaging system **100**, and may be supported on the client side by the messaging client **104** and/or on the server side by the application servers **114**. In one or more embodiments, the capturing, combining and previewing of video clip(s) as described herein may be implemented client side, server side and/or a combination of client side and server side.

As shown in FIG. **5**, the capture user interface **502** includes a camera selection button **506**, which is user-selectable for switching between the rear-facing and front-facing camera of the client device **102**. The capture user interface **502** further includes a flash button **508** for activating or deactivating a flash with respect to captured image data **512** (or a captured image). The capture user interface **502** further includes a camera mode selection button **510**. In addition, the capture user interface **502** includes a carousel launch button **522** for launching a carousel interface, as discussed below with respect to FIG. **6**D.

Moreover, the capture user interface **502** includes a capture button **520** which is user-selectable to capture video (e.g., video clips) and/or images (e.g., pictures). As described herein, a "video clip" corresponds to a series of video frames that runs for an uninterrupted period of time. For example, a video clip corresponds with the video captured from moment that the camera of starts recording until the moment the camera stops recording.

In one or more embodiments, the messaging client **104** in conjunction with the camera mode system **214** provides for a user to select between a first camera mode and a second camera mode for video capture. For example, the first camera mode corresponds with capturing a single video clip which is usable to generate a media content item. The second camera mode corresponds with capturing multiple video clips which may be combined to generate the media content item.

In this regard, the camera mode selection button **510** is user-selectable for switching between the first camera mode and the second camera mode. In one or more embodiments, the messaging client **104** defaults to the first camera mode. For example, upon startup of the messaging client **104**, the messaging client **104** activates the camera of the client device **102** to display captured image data **512** in real time, and to default to the first camera mode with respect to the capture user interface **502**.

In response to user selection of the camera mode selection button **510**, the messaging client **104** in conjunction with the camera mode system **214** provides for switching from the first camera mode to the second camera mode. Switching to the second camera mode may also be effected via a predefined touch gesture (e.g., a left drag gesture starting from the capture button **520** while in the first camera mode). In one or more embodiments, a tutorial (e.g., a modal or overlay) may be presented the first time the second camera mode is launched, to teach the user of features related to the second camera mode.

In the first camera mode, the capture button **520** is selectable to capture a single video clip via a predefined gesture (e.g., a press-and-hold gesture, where video is

recorded for the duration of the hold). In addition, the capture button **520** is selectable to capture a picture via another predefined gesture (e.g., tap gesture).

In the second camera mode, the behavior of the capture button **520** may differ from that of the first camera mode in order to facilitate capturing multiple video clips. In one or more embodiments, the capture button **520** is responsive to different types of touch input for capturing video clips. In a first example, the capture button **520** is selectable to capture a video clip via a press-and-hold gesture (e.g., where video is recorded for the duration of the hold). In another example, the capture button **520** is selectable to capture a video clip via first and second tap gestures, with the first tap gesture initiating video capture and the second tap gesture ending video capture for the video clip (e.g., corresponding to hands-free recording).

In one or more embodiments, a predefined touch region for the capture button **520** for the second tap gesture may smaller than for the first tap gesture (e.g., to reduce likelihood of the user inadvertently stopping video capture). For example, the touch region may correspond to a predefined region within the center of the displayed capture button **520**.

In the second camera mode, the camera mode system **214** provides for capturing the multiple video clips in a sequential manner, such that the first video clip is followed by the second video clip, the second video clip is followed by the third video clip, and so on. Each of the video clips may have been captured in response to respective touch inputs via the capture button **520** (e.g., press-and-hold gestures, first/second taps, or combinations thereof).

In one or more embodiments, the camera mode system **214** provides for displaying updates to the timeline progress bar **514** in real-time, to depict video clips as they are captured. As shown in the example of FIG. **5**, display of the timeline progress bar **514** may be accompanied by display of the undo button **516** and the preview button **518**. In one or more embodiments, the camera mode system **214** provides for displaying the undo button **516**, the timeline progress bar **514** and the preview button **518** in the second camera mode only. As such, the undo button **516**, the timeline progress bar **514** and the preview button **518** are not displayed while the first camera mode is active.

As shown in the example of FIG. **5**, the timeline progress bar **514** depicts video clips as respective segments, with the length of each segment being proportional to the duration of the respective video clip. The segments may be added and/or updated in real-time. The length of each segment may appear to increase in real-time as each respective video clip is being captured. For illustrative purposes, the expanded view **524** (which is not necessarily shown by the capture user interface **502**) depicts example video clips **15**.

In one or more embodiments, the timeline progress bar **514** is configured to update in real-time based on passing preset time thresholds with respect to the combined duration of all currently-captured video clips. For example, the initial timeline length for the timeline progress bar **514** may be preset to a first time threshold (e.g., 10 seconds) such that the timeline progress bar **514** is depicted to fill up upon reaching the first time threshold. Once the combined duration of currently-captured video clips reaches the first time threshold, the timeline length is adjusted to a second time threshold (e.g., 30 seconds), with the current progress (e.g., segment(s)) being depicted to collapse relative to the adjusted timeline length. Once the combined duration of currently-captured video clips reaches the second time threshold, the timeline length is adjusted to a third time threshold (e.g., 60 seconds), with the current progress (e.g., segment(s)) being depicted to collapse relative to the adjusted timeline length.

In one or more embodiments, the camera mode system **214** provides for limiting or capping the combined duration for all currently-captured video clips. For example, the camera mode system **214** may set a maximum duration to 60 seconds (e.g., corresponding to the above-mentioned third time threshold). The capture user interface **502** may display a notification if the total recording time reaches the maximum duration, to prevent the recording of subsequent video clips to include in the media content item.

The capture user interface **502** further includes the undo button **516**. As noted above, the undo button **516** may be presented while the second camera mode is active (and not while the first camera mode is active). The undo button **516** is selectable to delete the most recent video clip (e.g., corresponding to the last, or right-most, segment of the timeline progress bar **514**). In a case where no video clips are in the timeline progress bar **514**, the undo button **516** may be replaced with a close button (depicted as an "x" and discussed further below with respect to FIG. **7**), which is selectable to exit the second camera mode and revert to the first camera mode.

Reverting from the second camera mode to the first camera mode may also be effected by user selection of the camera mode selection button **510**. In response to user selection of the camera mode selection button **510** while in the second camera mode, the messaging client **104** may prompt the user to confirm that any captured video clips will be removed.

The capture user interface **502** further includes the preview button **518**. The preview button **518** is selectable to switch from the capture user interface **502** to the preview user interface **504**. On the other hand, the first camera mode in example embodiments may not include the preview button **518** and may instead automatically present a preview interface following capture of the single video clip (or picture).

In the second camera mode, the preview user interface **504** provides for previewing the captured video clips (e.g., clips **16**) as captured. In addition, the preview user interface **504** provides user-selectable elements for generating the media content item based on the captured video clips.

In one or more embodiments, the preview user interface **504** includes a user-selectable button (a "±" button, which is depicted and discussed further below with respect to FIG. **7**) for adding video clips to the captured video clips. Selection of this button may cause the camera mode system **214** to switch from the preview user interface **504** back to the capture user interface **502**, with all video clips and edits being preserved.

For example, the camera mode system **214** may facilitate preserving the clips in local memory in association with the collection management system **204**, and may facilitate preserving the edits in local memory in association with the augmentation system **208**. In addition to preserving video clips and/or edits with respect to the user-selectable button (the "+" button), the camera mode system **214** may preserve and re-present the video clips and/or edits with respect to the user switching between other interfaces and/or applications. For example, video clips and/or edits are preserved when returning to the camera selection button **506** or preview user interface **504** from one or more of: another interface within the messaging client **104** (e.g., a chat interface, a reply interface); an application other than the messaging client **104** (e.g., with the selected camera mode and/or timeline

progress also being preserved as facilitated by camera mode system **214**); and/or killing of the messaging client **104** (e.g., with the selected camera mode and/or timeline progress also being preserved).

Referring back to FIG. **5**, the preview user interface **504** includes editing tools **526** for modifying/annotating (e.g., drawing on, adding text to, adding stickers to, cropping, and the like) the captured video clips. While not shown in FIG. **5**, the preview user interface **504** may further include interface elements (e.g., buttons) for one or more of: saving the captured video clips (e.g., with modifications/annotations) as a media content item; creating or updating a Story based on the captured video clips (e.g., with modifications/annotations); modifying audio signal(s) associated with the captured video clips; sending a media content item which includes the captured video clips (e.g., with modifications/annotations) to a contact/friend; and/or broadcasting the media content item in association with a feed interface (e.g., for viewing by other users who are not necessarily contacts/friends).

As noted, the preview user interface **504** provides for a media content item to be generated based on the multiple video clips. In one or more embodiments, the messaging client **104** (e.g., in conjunction with the messaging server system **108**) is configured to combine the multiple video clips, together with modifications or annotations, to generate the media content item based on the combined video clips. The media content item may correspond to a single entity (e.g., video, message) which includes all of the clips (with modifications/annotations). In one or more embodiments, the media content item is configured to be played (e.g., with respect to a viewing user) continuously, so as to loop back to the first video clip after the last video clip is played.

FIGS. **6**A-**6**E illustrate a user interface (e.g., a capture user interface **602**) configured to capture multiple video clips for including into a media content item, in accordance with some example embodiments. FIGS. **6**A-**6**E depict example scenarios in which the user selects the above-mentioned second camera mode (FIG. **6**A), captures a first video clip (FIGS. **6**B-**6**C), launches a carousel interface (e.g., FIG. **6**D), and continues to capture video clips (FIG. **6**E).

Similar to the capture user interface **502** of FIG. **5**, the capture user interface **602** of FIGS. **6**A-**6**E includes one or more of: a camera selection button **604** (e.g., for switching between rear-facing and front-facing cameras), a flash button **606** (e.g., for activating and deactivating flash), a camera mode selection button **608** (e.g., for switching between the first and second camera modes), a capture button **610**, a carousel launch button **612** (e.g., for launching the carousel interface **624**), a timeline progress bar **616** (e.g., for displaying progress in capturing video clips), a close button **614** (e.g., for switching from the second camera mode back to the first camera mode), a preview button **618** (e.g., for previewing, editing and generating a media content item based on captured video clip(s)), and/or an undo button **622** (e.g., to delete the most recent video clip).

In the example of FIG. **6**A, the user selects the camera mode selection button **608**. In one or more embodiments, the capture user interface **602** may default to the first camera mode for capturing a single video clip. In response to selection of the camera mode selection button **608**, the messaging client **104** in conjunction with the camera mode system **214** provides for switching from the first camera mode to the second camera mode. As noted above, such switching may include adjusting the capture button **520** to be responsive to different types of touch input for capturing video, and/or adding the undo button **516**, the timeline progress bar **514** and the preview button **518** to the capture user interface **502**.

The close button **614** is a user-selectable button for closing out of the second camera mode. In response to user selection of the close button **614**, the camera mode system **214** provides for exiting the second camera mode and reverting to the first camera mode. In one or more embodiments, the close button **614** is presented when there are no captured video clips (e.g., no video clips have been captured, or all captured video clip(s) have been removed via the undo button **516**).

The capture user interface **602** also includes a preview button **618**, which is selectable to preview, edit and/or generate a media content item which includes the captured video clip(s). In one or more embodiments, the preview button **618** is enabled after a first video clip has been captured. Alternatively or in addition, the camera mode system **214** may implement a minimum video duration (e.g., 5 seconds) in order to enable the preview button **618**. In the example of FIG. **6**A, the preview button **618** is disabled since no video clips have yet been captured (e.g., the timeline progress bar **616** is empty). In one or more embodiments, display of the preview button **618** changes when switching from disabled (e.g., a grayed-out checkmark) to enabled (e.g., a yellow checkmark). A tool tip (e.g., a message indicating to "preview your media content item") may direct user attention to the enabled preview button **618**. The tool tip may be displayed only once (e.g., a first time), to advise the user that selection of the preview button **618** directs to the preview user interface **504**.

FIG. **6**B illustrates an example when the user initiates capture of a first video clip. For example, the user initiate capture of the first video clip based on touch input **620** (e.g., a press-and-hold gesture, or a first tap gesture as described above) via the capture button **610**. As shown in the example of FIG. **6**B, the timeline progress bar **616** is updated in real-time to display a first segment corresponding to the first video clip. The length of the first segment may appear to increase in real-time as each respective video clip is being captured.

FIG. **6**C illustrates when the user completes capture of the first video clip (e.g., release of the press-and-hold gesture, or a second tap gesture as described above). In one or more embodiments, upon completion of capturing the first video clip, the camera mode system **214** provides for updating the capture user interface **602** by replacing the close button **614** with the undo button **622** (e.g., which is selectable to remove the first video clip from the timeline progress bar **616**), and/or by enabling the preview button **618**.

As noted above, the carousel launch button **612** is user-selectable to launch the carousel interface **624**. In response to selection of the preview button **618**, the capture user interface **602** is updated (e.g., by the camera mode system **214**) to display the carousel interface **624** as shown in FIG. **6**D. In one or more embodiments, the carousel interface **624** allows the user to cycle through and/or select different augmented reality content items (e.g., Lenses) to apply/display with respect to images currently being captured by the device camera and being displayed on the device screen. Each of the available augmented reality content items is represented by an icon which is user-selectable for switching to the respective augmented reality content item.

In one or more embodiments, the icon corresponding to an active augmented reality content item (e.g., active AR icon **626**) is displayed in a different manner relative to (e.g., larger than) the remaining icons. Behavior of the active AR

icon **626** in the second camera mode is similar to that of the capture button **610**. For example, the user may select the active AR icon **626** to capture a subsequent video clip(s) via respective press-and-hold gestures and/or first and second tap gestures. The corresponding augmented reality content item (e.g., Lens) is applied to the subsequently-captured video clip(s). In addition, the user may select to apply different augmented reality content items to different video clips as they are captured. In one or more embodiments, a viewing user of the media content item, which includes augmented reality content, may be presented with an interface to apply (e.g., unlock) corresponding augmented reality content item(s) for modifying captured image/video from their end.

In the example of FIG. **6**E, the user has captured four video clips, as depicted by respective segments in the timeline progress bar **616**. As noted above, the undo button **622** is selectable to remove video clip(s) from the timeline progress bar **616** (e.g., with each tap gesture for removing the most recent video clip). The capture user interface **602** further includes a preview button **618**, which is selectable to preview, edit and/or generate a media content item based on the captured video clips via a preview user interface **702** as discussed below with respect to FIG. **7**.

FIG. **7** illustrates the preview user interface **702** for previewing multiple video clips for combining into a media content item, in accordance with some example embodiments. For example, FIG. **7** depicts an example scenario in which the user selects to preview the multiple video clips (e.g., 4 video clips) captured in association with FIG. **6**D.

Similar to the preview user interface **504** of FIG. **5**, the preview user interface **702** of FIG. **7** includes editing tools **704**. For example, the editing tools **704** include user-selectable icons (e.g., buttons) for modifying/annotating (e.g., drawing on, adding text to, adding stickers to, cropping, and the like) the captured video clips. The user-selectable icons may include an option for selecting between looping, bouncing (e.g., switching between forward and reverse playback) and/or single playback with respect to the resulting media content item.

In addition, the preview user interface **702** includes: a save button **714** which is selectable to save the captured video clips (e.g., with modifications/annotations) as a media content item; a story button **716** which is selectable to create a Story based on the captured video clips (e.g., with modifications/annotations); an audio button **712** which is selectable to modify audio signal(s) associated with the captured video clips; and/or a send button **718** which is selectable to send a media content item which combines the captured video clips (e.g., including any modifications/annotations) to a recipient (e.g., a contact/friend) and/or to broadcast the media content item to other users of the messaging system **100**.

Moreover, the preview user interface **702** provides for looping playback (e.g., for preview purposes) of the captured video clip(s), as shown by looped playback **722**. The preview user interface **702** further includes a video preview **708** in which each video clip is represented as a respective thumbnail and in which a position indicator **720** indicates a current playback position for the looped playback **722**. The thumbnails are depicted as combined together (e.g., as a combined video clip). In one or more embodiments, the thumbnails are individually selectable for editing/deleting (e.g., in conjunction with one or more of the editing tools **704**).

In addition, the preview user interface **702** includes an add video button **710** for adding video clips to the captured video clips (e.g., which are viewable via the video preview **708**). In response to user selection of the add video button **710** (e.g., or alternatively, a predefined gesture such as a swipe down gesture within a predefined region of the preview user interface **702**), the camera mode system **214** provides for switching from the preview user interface **702** back to the capture user interface **502**, with all video clips and edits being preserved. A tool tip (e.g., a message indicating to "go back to camera to add more") may direct user attention to the add video button **710**. The tool tip may be displayed only once (e.g., a first time), to advise the user that selection of the add video button **710** directs to the capture user interface **502**.

With respect to preserving video clips and edits, the camera mode system **214** may facilitate preserving the clips in local memory in association with the collection management system **204**, and may facilitate preserving the edits (e.g., via the editing tools **704**) in local memory in association with the augmentation system **208**. In one or more embodiments, the preview user interface **702** further includes a close button **706** which is selectable to exit the preview user interface **702** and return to the capture user interface **502** without video clips and/or edits being preserved. In one or more embodiments, user selection of the close button **706** may prompt the user to confirm deletion of the video clips and/or edits.

FIGS. **8**A-**8**C illustrate switching between a carousel interface **816** (included within a capture user interface **802**) and an explorer interface **804** for selecting augmented reality content items in association with multi-video clip capture, in accordance with some example embodiments. FIGS. **8**A-**8**C depict example scenarios in which: a user is presented with a carousel interface **816** and selects an explore tab **826** to switch to an explorer interface **804** for browsing available augmented reality content items (e.g., FIG. **8**A), the user selects an augmented reality content item via the explorer interface **804** (FIG. **8**B), and the user is presented with an updated carousel interface **816** which is configured to persistently include the selected augmented reality content item (e.g., FIG. **8**C).

Similar to the capture user interface **602** of FIG. **6**D, the capture user interface **802** of FIGS. **8**A-**8**C includes one or more of the following interface elements: a camera selection button **806** (e.g., for switching between rear-facing and front-facing cameras); a flash button **808** (e.g., for activating and deactivating flash); a camera mode selection button **810** (e.g., for switching between the first and second camera modes); captured image data **812** (e.g., corresponding to real-time video/images captured by the device camera); a carousel interface **816** (e.g., for cycling through and/or selecting different augmented reality content items, with the active AR icon **814** corresponding to a currently-selected augmented reality content item); a timeline progress bar **820** (e.g., for displaying progress in capturing video clips); an undo button **818** (e.g., for deleting the most recent video clip); and/or a preview button **822** (e.g., for previewing, editing and generating a media content item based on captured video clip(s)). These interface elements in the capture user interface **802** of FIGS. **8**A-**8**C are configured to perform functions similar to those described above with respect to the capture user interface **602** of FIG. **6**D.

As shown in FIG. **8**A, the camera mode selection button **810** is highlighted, thereby indicating that the second camera mode is enabled for capturing multiple video clips. In the example of FIG. **8**A, one video clip has been captured, for example, as depicted by the timeline progress bar **820**

including a single segment. The preview button **822** is enabled (e.g., not grayed out).

Similar to FIG. **6**D as described above, the carousel interface **816** of FIG. **8**A allows the user to cycle through and/or select different augmented reality content items (e.g., Lenses) to apply/display with respect to the captured image data **812**. Each augmented reality content items in the carousel interface **816** is represented by an icon which is user-selectable for switching to the respective augmented reality content item.

The active AR icon **814** is displayed in a different manner relative to (e.g., larger than) the remaining icons. In the example of FIG. **8**A, the active AR icon **814** is blank, indicating that an augmented reality content item has not been selected (e.g., corresponding to no AR being applied to the captured image data **812**). The user may select the active AR icon **626** to capture additional video clip(s) via respective press-and-hold gestures and/or first and second tap gestures. In addition, the user may select to apply different augmented reality content items to different video clips as they are captured (e.g., such that the generated media content item includes different augmented reality content for different video clips).

In one or more embodiments, the augmented reality content items presented within the carousel interface **816** correspond to a first set of available augmented reality content items. For example, the messaging client **104** in conjunction with the augmentation system **208** is configured to determine the first set of augmented reality content items based on one or more of: a geolocation of the device (e.g., where the augmented reality content items relate to the geolocation); an object detected in the captured image data **812** (e.g., where the augmented reality content items relate to the detected object, such as a face or scenery); a rear-facing or front-facing camera status of the device (e.g., where the augmented reality content items are associated with front or rear capture); user history associated with augmented reality content items (e.g., previously-selected augmented reality content items); and/or user preferences associated with augmented reality content items (e.g., user-specified augmented reality content items such as favorites). An indication of the first set of augmented reality content items may be stored by and accessible via the augmentation system **208**.

In one or more embodiments, the carousel interface **816** is presented in association with selection of a browse tab **824** included within the capture user interface **802**. In the example of FIG. **8**A, the browse tab **824** is selected and as such, the carousel interface **816** is presented for browsing through the first set of augmented reality content items.

The messaging client **104** also provides for browsing a second set of augmented reality content items. In this regard, the capture user interface **802** includes an explore tab **826** which is user-selectable to display the explorer interface **804** shown in FIG. **8**B. As shown in FIG. **8**B, the explorer interface **804** includes a tiled interface **830** corresponding to the second set of augmented reality content items. In one or more embodiments, the messaging client **104** in conjunction with the augmentation system **208** is configured to determine the second set of augmented reality content items. The second set of augmented reality content items may correspond to augmented reality content items created by users of the messaging system **100**.

For example, a user (creator) may design and submit augmented reality content item(s) for use by others within the messaging system **100**. The submitted augmented reality content item(s) may be subject to an approval process (e.g., including administrator approval) in order to be included within the second set of augmented reality content items. An indication of the second set of augmented reality content items may be stored by and accessible via the augmentation system **208**.

In one or more embodiments, the messaging client **104** in conjunction with the augmentation system **208** facilitates populating the tiled interface **830** with the second set of augmented reality content items. Each augmented reality content item within in the second set is represented as a respective tile. Each tile includes a sample photo (or sample gif) of the corresponding augmented reality content, an icon representing the augmented reality content item (e.g., as discussed above with respect to the carousel interface **816**), and a name of the augmented reality content item. The tiled interface **830** provides for scrolling (e.g., vertically scrolling) through the augmented reality content items of the second set in response to a predefined gesture (e.g., a swipe or drag gesture).

The user may select a particular augmented reality content item presented within the tiled interface **830** via a predefined gesture (e.g., by tapping the corresponding augmented reality content item). In the example of FIG. **8**B, the user selects the AR content item **832** which is represented by the AR icon **834**.

In one or more embodiments, the augmented reality content items within the second set may be grouped via AR tabs **828**. In the example of FIG. **8**B, the AR tabs **828** include a For You tab (e.g., which may be based at least in part on user history and/or preference), a Trending tab (e.g., based on popularity among users), a Holidays tab (e.g., for relevant holidays and/or seasons), a Face tab (e.g., with face-based effects), a World tab (e.g., for scenic effects) and a Music tab (e.g., for music-related augmented reality content items).

Moreover, the augmented reality content items within the second set may be searched for and/or filtered via the search interface **836**. For example, the search interface **836** is configured to receive text-based search input based on one or more of the name, types of detected objects, type of content, and the like. The augmented reality content items may be searchable by one or more of these terms, for example, based on metadata associated with the augmented reality content items. In response to text-based search input entered within the search interface **836** (e.g., including partial and/or complete search terms), the messaging client **104** provides for the tiled interface **830** to present augmented reality content items that match the entered text.

Thus, the messaging client **104** provides for a user to browse through different sets of augmented reality content items. In particular, the browse tab **824** within the capture user interface **802** is selectable to browse the first of augmented reality content items via the carousel interface **816**. In addition, the explore tab **826** within the capture user interface **802** is selectable to surface the explorer interface **804** for browsing and/or searching the second set of augmented reality content items.

In response to user selection of the AR content item **832** within the tiled interface **830**, the messaging client **104** switches from the explorer interface **804** back to the capture user interface **802** as shown in FIG. **8**C. In switching, the messaging client **104** in conjunction with the augmentation system **208** may provide for unlocking the AR content item **832**, for example, by activating the AR content item **832** within the capture user interface **802**. As shown in the example of FIG. **8**C, the captured image data **812** is modified (e.g., in real-time) to include augmented reality content (e.g., effect) corresponding to the AR content item **832**. In addi-

tion, the carousel interface **816** is updated to indicate the that the AR icon **834** is the active AR icon **814**.

In addition, the messaging client **104** in conjunction with the augmentation system **208** provides for updating the first set of augmented reality content items to include the AR content item **832** in a persistent manner. The carousel interface **816** may therefore persistently present the corresponding AR icon **834** while the second camera mode is active (e.g., while the camera mode selection button **810** is highlighted) in the capture user interface **802**.

In this regard, the messaging client **104** is configured to manage different camera instances with respect to messaging. For example, the messaging client **104** is configured to manage or otherwise maintain a main camera instance, and one or more modular camera instances. As described herein, the main camera instance corresponds with an active session of the capture user interface **802** as presented in FIGS. **8**A-**8**C. The main camera instance may be associated with the active session for capturing video (e.g., upon startup of the messaging client **104**).

On the other hand, the messaging client **104** may invoke or otherwise create one or more modular camera instances in association with other user interfaces provided by the messaging client **104**. By way of non-limiting example, the messaging client **104** may create a modular camera instance in association with a reply interface. The reply interface may be surfaced when a user responds to a message (e.g., from a friend), a Story, a chat or the like. The reply interface may activate the device camera in order to capture video/pictures to include in a reply. As such, the reply interface may include interface elements (e.g., similar to one or more of the elements **806822** within the capture user interface **802**) for capturing and/or augmenting video. The messaging client **104** is configured to create a modular camera instance with respect to the reply interface.

Thus, the messaging client **104** is configured to maintain separate camera instances, including a main camera instance and one or more modular camera instances with respect to capturing video and/or pictures. By virtue of maintaining such camera instances, it is possible for the messaging client **104** to preserve settings and/or preferences with respect to images captured across different user interfaces of the messaging client **104**.

Regarding the second camera mode (e.g., for multi-video clip capture), the messaging client **104** is configured to save an indication of selections and/or input within the explorer interface **804** in association with the main camera instance. In doing so, the selections and/or input persist when switching between the explorer interface **804** and the capture user interface **802**. As noted above with respect to FIG. **8**C, the AR content item **832** is unlocked (e.g., activated and/or presented) within the capture user interface **802** in response to user selection of the AR content item **832** within the explorer interface **804**. In one or more embodiments, the unlocking by the messaging client **104** is performed with respect to the main camera instance, to facilitate saving the indication of selections and/or input within the explorer interface **804**.

Thus, one example of persisting selections and/or input between the explorer interface **804** and the capture user interface **802** corresponds to user selection of the AR content item **832** via the explorer interface **804** (e.g., via the tiled interface **830** or the search interface **836**). An indication of the AR content item **832** is stored (e.g., in local memory as an update to the first subset of augmented reality content items) and used to populate the carousel interface **816** when switching thereto. In one or more embodiments, the user may switch away from the capture user interface **802** multiple times (e.g., by switching to different user interfaces within the messaging client **104** and/or by switching between the messaging client **104** and other applications). However, the messaging client **104** is configured to persistently present the AR icon **834** within the carousel interface **816** when the user returns to the capture user interface **802**.

In one or more embodiments, the messaging client **104** provides for positioning the AR icon **834** in a first position (e.g., immediately to the right of the active AR icons **814**) upon subsequently returning to the capture user interface **802**. The user may further continue to select additional augmented reality content items via the explorer interface **804** (e.g., via the tiled interface **830** and/or the search interface **836**). The messaging client **104** may store respective indications for each augmented reality content item selected via the explorer interface **804**, for persistently presenting (e.g., in front of previously unlocked augmented reality content items) within the carousel interface **816**.

In one or more embodiments, the messaging client **104** is configured to remove the stored indication of the selected AR content item **832** (e.g., from local memory) upon completion of a session corresponding to the second camera mode. In one or more embodiments, removing the stored indication causes the messaging client **104** to no longer present the selected AR content item **832** within the carousel interface **816**.

The session may be determined to be completed when the user opts to disable the second camera mode (e.g., by tapping the camera mode selection button **810** or selecting a close button as described above), and/or when the user selects to send and/or upload the media content item including the captured video from the session (e.g., by selecting a save button, send button, and/or Story button as described above). In a case where the user sends and/or uploads the media content item, the messaging client **104** may in example embodiments delay removal of the stored indication and continue to persist the stored indication for a preset period of time (e.g., 48 hours after selecting to send and/or broadcast). In such instance, the indication may be stored in the database **126** for the preset period of time, and removed thereafter.

In addition to persisting the selected AR content item **832**, the messaging client **104** in example embodiments is configured to save an indication of a position (e.g., a most recent position) within the tiled interface **830** and AR tabs **828** of the explorer interface **804**. Thus, in a case of subsequently switching back to the explorer interface **804**, the most recent position (e.g., the vertical position within the tiled interface **830** and/or the active tab within AR tabs **828**) is persisted in conjunction with the main camera instance. The stored indication may be removed upon completion of the session corresponding to the second camera mode, such that the position no longer persists (e.g., the tiled interface **830** starts from a default position) when subsequently navigating to the explorer interface **804**.

Further, the messaging client **104** in example embodiments is configured to save an indication of text-based search term(s) input (e.g., most recently input) by the user within the search interface **836** of the explorer interface **804**. Thus, in a case of subsequently switching back to the explorer interface **804**, the most recently-entered search terms (e.g., together with the active tab within AR tabs **828**) may persist within the search interface **836**. The stored indication may be removed upon completion of the session corresponding to the second camera modem, such that the

search term no longer persists (e.g., the search interface **836** is instead empty) when subsequently navigating to the explorer interface **804**.

Thus, the messaging client **104** provides for persisting indications of user selections between the explorer interface **804** and the capture user interface **802**. As a result, it is possible for the messaging client **104** to unlock, present and navigate through augmented reality content items in a more persistent manner.

FIG. **9** is a flowchart illustrating a process **900** for presenting available augmented reality content items in association with multi-video clip capture, in accordance with some example embodiments. For explanatory purposes, the process **900** is primarily described herein with reference to the messaging client **104** of FIG. **1**. However, one or more blocks (or operations) of the process **900** may be performed by one or more other components, and/or by other suitable devices. Further for explanatory purposes, the blocks (or operations) of the process **900** are described herein as occurring in serial, or linearly. However, multiple blocks (or operations) of the process **900** may occur in parallel or concurrently. In addition, the blocks (or operations) of the process **900** need not be performed in the order shown and/or one or more blocks (or operations) of the process **900** need not be performed and/or can be replaced by other operations. The process **900** may be terminated when its operations are completed. In addition, the process **900** may correspond to a method, a procedure, an algorithm, etc.

The messaging client **104** (e.g., in conjunction with the augmentation system **208**) displays a capture user interface in accordance with a camera mode configured to capture multiple video clips for combining to generate a media content item (block **902**). Display of the capture user interface in accordance with the camera mode may be associated with a main camera instance of the messaging application, the main camera instance being separate from one or more modular camera instances associated other user interfaces of the messaging application.

The messaging client **104** displays a carousel interface within the capture user interface, the carousel interface for presenting a first set of augmented reality content items, each augmented reality content item within the first set of augmented reality content items being selectable to apply respective augmented reality content to captured video (block **904**). The first set of augmented reality content items may be based on one or more of a geolocation of the device, an object detected in the captured video, a rear-facing or front-facing camera status of the device, user history associated with augmented reality content items, or user preferences associated with augmented reality content items.

The messaging client **104** receives first user input selecting an explore tab included within the capture user interface, the explore tab being selectable to switch to an explorer user interface for presenting a second set of augmented reality content items (block **906**). The second set of augmented reality content items may correspond to augmented reality content items created by users of the messaging application. The carousel interface may be displayed in association with a browse tab included within the capture user interface, such that the browse tab is selectable to browse the first set of augmented reality content items via the carousel interface and the explore tab is selectable to browse or search the second set of augmented reality content items via the explorer user interface.

The messaging client **104** switches, in response to receiving the first user input, from the capture user interface to the explorer user interface (block **908**). The messaging client **104** receives, via the explorer user interface, second user input selecting an augmented reality content item from among the second set of augmented reality content items (block **910**). The messaging client **104** may unlock, in response to receiving the second user input, the selected augmented reality content item for use with respect to the main camera instance.

The messaging client **104**, in response to receiving the second user input, switches from the explorer user interface to the capture user interface based on the selected augmented reality content item, and updates the first set of augmented reality content items to include the selected augmented reality content item, such that the carousel interface persistently presents the selected augmented reality content item as part of the first set of augmented reality content items (block **912**). Persistently presenting the selected augmented reality content item as part of the first set of augmented reality content items may include storing an indication of the selected augmented reality content item in association with the main camera instance.

The messaging client **104** may remove the stored indication of the selected augmented reality content item upon completion of a session corresponding to the camera mode. The messaging client **104** may store a position within the explorer user interface in association with the main camera instance, and navigate to the stored position within the explorer user interface in response to subsequent user input selecting the explore tab.

The explorer user interface may include a search interface for text-based searching of the second set of augmented reality content items. Storing the position may further include storing a text-based search term provided within the search interface. Navigating to the stored position may further include pre-populating the search interface with the text-based search term in response to the subsequent user input.

FIG. **10** is a schematic diagram illustrating an access-limiting process **1000**, in terms of which access to content (e.g., an ephemeral message **1002**, and associated multimedia payload of data) or a content collection (e.g., an ephemeral message group **1004**) may be time-limited (e.g., made ephemeral).

An ephemeral message **1002** is shown to be associated with a message duration parameter **1006**, the value of which determines an amount of time that the ephemeral message **1002** will be displayed to a receiving user of the ephemeral message **1002** by the messaging client **104**. In one example, an ephemeral message **1002** is viewable by a receiving user for up to a maximum of 10 seconds, depending on the amount of time that the sending user specifies using the message duration parameter **1006**.

The message duration parameter **1006** and the message receiver identifier **424** are shown to be inputs to a message timer **1010**, which is responsible for determining the amount of time that the ephemeral message **1002** is shown to a particular receiving user identified by the message receiver identifier **424**. In particular, the ephemeral message **1002** will only be shown to the relevant receiving user for a time period determined by the value of the message duration parameter **1006**. The message timer **1010** is shown to provide output to a more generalized ephemeral timer system **202**, which is responsible for the overall timing of display of content (e.g., an ephemeral message **1002**) to a receiving user.

The ephemeral message **1002** is shown in FIG. **10** to be included within an ephemeral message group **1004** (e.g., a

collection of messages in a personal story, or an event story). The ephemeral message group **1004** has an associated group duration parameter **1008**, a value of which determines a time duration for which the ephemeral message group **1004** is presented and accessible to users of the messaging system **100**. The group duration parameter **1008**, for example, may be the duration of a music concert, where the ephemeral message group **1004** is a collection of content pertaining to that concert. Alternatively, a user (either the owning user or a curator user) may specify the value for the group duration parameter **1008** when performing the setup and creation of the ephemeral message group **1004**.

Additionally, each ephemeral message **1002** within the ephemeral message group **1004** has an associated group participation parameter **1012**, a value of which determines the duration of time for which the ephemeral message **1002** will be accessible within the context of the ephemeral message group **1004**. Accordingly, a particular ephemeral message group **1004** may "expire" and become inaccessible within the context of the ephemeral message group **1004**, prior to the ephemeral message group **1004** itself expiring in terms of the group duration parameter **1008**. The group duration parameter **1008**, group participation parameter **1012**, and message receiver identifier **424** each provide input to a group timer **1014**, which operationally determines, firstly, whether a particular ephemeral message **1002** of the ephemeral message group **1004** will be displayed to a particular receiving user and, if so, for how long. Note that the ephemeral message group **1004** is also aware of the identity of the particular receiving user as a result of the message receiver identifier **424**.

Accordingly, the group timer **1014** operationally controls the overall lifespan of an associated ephemeral message group **1004**, as well as an individual ephemeral message **1002** included in the ephemeral message group **1004**. In one example, each and every ephemeral message **1002** within the ephemeral message group **1004** remains viewable and accessible for a time period specified by the group duration parameter **1008**. In a further example, a certain ephemeral message **1002** may expire, within the context of ephemeral message group **1004**, based on a group participation parameter **1012**. Note that a message duration parameter **1006** may still determine the duration of time for which a particular ephemeral message **1002** is displayed to a receiving user, even within the context of the ephemeral message group **1004**. Accordingly, the message duration parameter **1006** determines the duration of time that a particular ephemeral message **1002** is displayed to a receiving user, regardless of whether the receiving user is viewing that ephemeral message **1002** inside or outside the context of an ephemeral message group **1004**.

The ephemeral timer system **202** may furthermore operationally remove a particular ephemeral message **1002** from the ephemeral message group **1004** based on a determination that it has exceeded an associated group participation parameter **1012**. For example, when a sending user has established a group participation parameter **1012** of 24 hours from posting, the ephemeral timer system **202** will remove the relevant ephemeral message **1002** from the ephemeral message group **1004** after the specified 24 hours. The ephemeral timer system **202** also operates to remove an ephemeral message group **1004** when either the group participation parameter **1012** for each and every ephemeral message **1002** within the ephemeral message group **1004** has expired, or when the ephemeral message group **1004** itself has expired in terms of the group duration parameter **1008**.

In certain use cases, a creator of a particular ephemeral message group **1004** may specify an indefinite group duration parameter **1008**. In this case, the expiration of the group participation parameter **1012** for the last remaining ephemeral message **1002** within the ephemeral message group **1004** will determine when the ephemeral message group **1004** itself expires. In this case, a new ephemeral message **1002**, added to the ephemeral message group **1004**, with a new group participation parameter **1012**, effectively extends the life of an ephemeral message group **1004** to equal the value of the group participation parameter **1012**.

Responsive to the ephemeral timer system **202** determining that an ephemeral message group **1004** has expired (e.g., is no longer accessible), the ephemeral timer system **202** communicates with the messaging system **100** (and, for example, specifically the messaging client **104**) to cause an indicium (e.g., an icon) associated with the relevant ephemeral message group **1004** to no longer be displayed within a user interface of the messaging client **104**. Similarly, when the ephemeral timer system **202** determines that the message duration parameter **1006** for a particular ephemeral message **1002** has expired, the ephemeral timer system **202** causes the messaging client **104** to no longer display an indicium (e.g., an icon or textual identification) associated with the ephemeral message **1002**.

FIG. **11** is a diagrammatic representation of the machine **1100** within which instructions **1110** (e.g., software, a program, an application, an applet, an app, or other executable code) for causing the machine **1100** to perform any one or more of the methodologies discussed herein may be executed. For example, the instructions **1110** may cause the machine **1100** to execute any one or more of the methods described herein. The instructions **1110** transform the general, non-programmed machine **1100** into a particular machine **1100** programmed to carry out the described and illustrated functions in the manner described. The machine **1100** may operate as a standalone device or may be coupled (e.g., networked) to other machines. In a networked deployment, the machine **1100** may operate in the capacity of a server machine or a client machine in a server-client network environment, or as a peer machine in a peer-to-peer (or distributed) network environment. The machine **1100** may comprise, but not be limited to, a server computer, a client computer, a personal computer (PC), a tablet computer, a laptop computer, a netbook, a set-top box (STB), a personal digital assistant (PDA), an entertainment media system, a cellular telephone, a smartphone, a mobile device, a wearable device (e.g., a smartwatch), a smart home device (e.g., a smart appliance), other smart devices, a web appliance, a network router, a network switch, a network bridge, or any machine capable of executing the instructions **1110**, sequentially or otherwise, that specify actions to be taken by the machine **1100**. Further, while only a single machine **1100** is illustrated, the term "machine" shall also be taken to include a collection of machines that individually or jointly execute the instructions **1110** to perform any one or more of the methodologies discussed herein. The machine **1100**, for example, may comprise the client device **102** or any one of a number of server devices forming part of the messaging server system **108**. In some examples, the machine **1100** may also comprise both client and server systems, with certain operations of a particular method or algorithm being performed on the server-side and with certain operations of the particular method or algorithm being performed on the client-side.

The machine **1100** may include processors **1104**, memory **1106**, and input/output I/O components **1102**, which may be

configured to communicate with each other via a bus **1140**. In an example, the processors **1104** (e.g., a Central Processing Unit (CPU), a Reduced Instruction Set Computing (RISC) Processor, a Complex Instruction Set Computing (CISC) Processor, a Graphics Processing Unit (GPU), a Digital Signal Processor (DSP), an Application Specific Integrated Circuit (ASIC), a Radio-Frequency Integrated Circuit (RFIC), another processor, or any suitable combination thereof) may include, for example, a processor **1108** and a processor **1112** that execute the instructions **1110**. The term "processor" is intended to include multi-core processors that may comprise two or more independent processors (sometimes referred to as "cores") that may execute instructions contemporaneously. Although FIG. **11** shows multiple processors **1104**, the machine **1100** may include a single processor with a single-core, a single processor with multiple cores (e.g., a multi-core processor), multiple processors with a single core, multiple processors with multiples cores, or any combination thereof.

The memory **1106** includes a main memory **1114**, a static memory **1116**, and a storage unit **1118**, both accessible to the processors **1104** via the bus **1140**. The main memory **1106**, the static memory **1116**, and storage unit **1118** store the instructions **1110** embodying any one or more of the methodologies or functions described herein. The instructions **1110** may also reside, completely or partially, within the main memory **1114**, within the static memory **1116**, within machine-readable medium **1120** within the storage unit **1118**, within at least one of the processors **1104** (e.g., within the Processor's cache memory), or any suitable combination thereof, during execution thereof by the machine **1100**.

The I/O components **1102** may include a wide variety of components to receive input, provide output, produce output, transmit information, exchange information, capture measurements, and so on. The specific I/O components **1102** that are included in a particular machine will depend on the type of machine. For example, portable machines such as mobile phones may include a touch input device or other such input mechanisms, while a headless server machine will likely not include such a touch input device. It will be appreciated that the I/O components **1102** may include many other components that are not shown in FIG. **11**. In various examples, the I/O components **1102** may include user output components **1126** and user input components **1128**. The user output components **1126** may include visual components (e.g., a display such as a plasma display panel (PDP), a light-emitting diode (LED) display, a liquid crystal display (LCD), a projector, or a cathode ray tube (CRT)), acoustic components (e.g., speakers), haptic components (e.g., a vibratory motor, resistance mechanisms), other signal generators, and so forth. The user input components **1128** may include alphanumeric input components (e.g., a keyboard, a touch screen configured to receive alphanumeric input, a photo-optical keyboard, or other alphanumeric input components), point-based input components (e.g., a mouse, a touchpad, a trackball, a joystick, a motion sensor, or another pointing instrument), tactile input components (e.g., a physical button, a touch screen that provides location and force of touches or touch gestures, or other tactile input components), audio input components (e.g., a microphone), and the like.

In further examples, the I/O components **1102** may include biometric components **1130**, motion components **1132**, environmental components **1134**, or position components **1136**, among a wide array of other components. For example, the biometric components **1130** include components to detect expressions (e.g., hand expressions, facial expressions, vocal expressions, body gestures, or eye-tracking), measure biosignals (e.g., blood pressure, heart rate, body temperature, perspiration, or brain waves), identify a person (e.g., voice identification, retinal identification, facial identification, fingerprint identification, or electroencephalogram-based identification), and the like. The motion components **1132** include acceleration sensor components (e.g., accelerometer), gravitation sensor components, rotation sensor components (e.g., gyroscope).

The environmental components **1134** include, for example, one or cameras (with still image/photograph and video capabilities), illumination sensor components (e.g., photometer), temperature sensor components (e.g., one or more thermometers that detect ambient temperature), humidity sensor components, pressure sensor components (e.g., barometer), acoustic sensor components (e.g., one or more microphones that detect background noise), proximity sensor components (e.g., infrared sensors that detect nearby objects), gas sensors (e.g., gas detection sensors to detection concentrations of hazardous gases for safety or to measure pollutants in the atmosphere), or other components that may provide indications, measurements, or signals corresponding to a surrounding physical environment.

With respect to cameras, the client device **102** may have a camera system comprising, for example, front cameras on a front surface of the client device **102** and rear cameras on a rear surface of the client device **102**. The front cameras may, for example, be used to capture still images and video of a user of the client device **102** (e.g., "selfies"), which may then be augmented with augmentation data (e.g., filters) described above. The rear cameras may, for example, be used to capture still images and videos in a more traditional camera mode, with these images similarly being augmented with augmentation data. In addition to front and rear cameras, the client device **102** may also include a 360° camera for capturing 360° photographs and videos.

Further, the camera system of a client device **102** may include dual rear cameras (e.g., a primary camera as well as a depth-sensing camera), or even triple, quad or penta rear camera configurations on the front and rear sides of the client device **102**. These multiple cameras systems may include a wide camera, an ultra-wide camera, a telephoto camera, a macro camera and a depth sensor, for example.

The position components **1136** include location sensor components (e.g., a GPS receiver component), altitude sensor components (e.g., altimeters or barometers that detect air pressure from which altitude may be derived), orientation sensor components (e.g., magnetometers), and the like.

Communication may be implemented using a wide variety of technologies. The I/O components **1102** further include communication components **1138** operable to couple the machine **1100** to a network **1122** or devices **1124** via respective coupling or connections. For example, the communication components **1138** may include a network interface Component or another suitable device to interface with the network **1122**. In further examples, the communication components **1138** may include wired communication components, wireless communication components, cellular communication components, Near Field Communication (NFC) components, Bluetooth® components (e.g., Bluetooth® Low Energy), Wi-Fi® components, and other communication components to provide communication via other modalities. The devices **1124** may be another machine or any of a wide variety of peripheral devices (e.g., a peripheral device coupled via a USB).

Moreover, the communication components **1138** may detect identifiers or include components operable to detect

identifiers. For example, the communication components **1138** may include Radio Frequency Identification (RFID) tag reader components, NFC smart tag detection components, optical reader components (e.g., an optical sensor to detect one-dimensional bar codes such as Universal Product Code (UPC) bar code, multi-dimensional bar codes such as Quick Response (QR) code, Aztec code, Data Matrix, Dataglyph, MaxiCode, PDF417, Ultra Code, UCC RSS-2D bar code, and other optical codes), or acoustic detection components (e.g., microphones to identify tagged audio signals). In addition, a variety of information may be derived via the communication components **1138**, such as location via Internet Protocol (IP) geolocation, location via Wi-Fi® signal triangulation, location via detecting an NFC beacon signal that may indicate a particular location, and so forth.

The various memories (e.g., main memory **1114**, static memory **1116**, and memory of the processors **1104**) and storage unit **1118** may store one or more sets of instructions and data structures (e.g., software) embodying or used by any one or more of the methodologies or functions described herein. These instructions (e.g., the instructions **1110**), when executed by processors **1104**, cause various operations to implement the disclosed examples.

The instructions **1110** may be transmitted or received over the network **1122**, using a transmission medium, via a network interface device (e.g., a network interface component included in the communication components **1138**) and using any one of several well-known transfer protocols (e.g., hypertext transfer protocol (HTTP)). Similarly, the instructions **1110** may be transmitted or received using a transmission medium via a coupling (e.g., a peer-to-peer coupling) to the devices **1124**.

FIG. **12** is a block diagram **1200** illustrating a software architecture **1204**, which can be installed on any one or more of the devices described herein. The software architecture **1204** is supported by hardware such as a machine **1202** that includes processors **1220**, memory **1226**, and PO components **1238**. In this example, the software architecture **1204** can be conceptualized as a stack of layers, where each layer provides a particular functionality. The software architecture **1204** includes layers such as an operating system **1212**, libraries **1210**, frameworks **1208**, and applications **1206**. Operationally, the applications **1206** invoke API calls **1250** through the software stack and receive messages **1252** in response to the API calls **1250**.

The operating system **1212** manages hardware resources and provides common services. The operating system **1212** includes, for example, a kernel **1214**, services **1216**, and drivers **1222**. The kernel **1214** acts as an abstraction layer between the hardware and the other software layers. For example, the kernel **1214** provides memory management, processor management (e.g., scheduling), component management, networking, and security settings, among other functionality. The services **1216** can provide other common services for the other software layers. The drivers **1222** are responsible for controlling or interfacing with the underlying hardware. For instance, the drivers **1222** can include display drivers, camera drivers, BLUETOOTH® or BLUETOOTH® Low Energy drivers, flash memory drivers, serial communication drivers (e.g., USB drivers), WI-FI® drivers, audio drivers, power management drivers, and so forth.

The libraries **1210** provide a common low-level infrastructure used by the applications **1206**. The libraries **1210** can include system libraries **1218** (e.g., C standard library) that provide functions such as memory allocation functions, string manipulation functions, mathematic functions, and the like. In addition, the libraries **1210** can include API libraries **1224** such as media libraries (e.g., libraries to support presentation and manipulation of various media formats such as Moving Picture Experts Group-4 (MPEG4), Advanced Video Coding (H.264 or AVC), Moving Picture Experts Group Layer-3 (MP3), Advanced Audio Coding (AAC), Adaptive Multi-Rate (AMR) audio codec, Joint Photographic Experts Group (JPEG or JPG), or Portable Network Graphics (PNG)), graphics libraries (e.g., an OpenGL framework used to render in two dimensions (2D) and three dimensions (3D) in a graphic content on a display), database libraries (e.g., SQLite to provide various relational database functions), web libraries (e.g., WebKit to provide web browsing functionality), and the like. The libraries **1210** can also include a wide variety of other libraries **1228** to provide many other APIs to the applications **1206**.

The frameworks **1208** provide a common high-level infrastructure that is used by the applications **1206**. For example, the frameworks **1208** provide various graphical user interface (GUI) functions, high-level resource management, and high-level location services. The frameworks **1208** can provide a broad spectrum of other APIs that can be used by the applications **1206**, some of which may be specific to a particular operating system or platform.

In an example, the applications **1206** may include a home application **1236**, a contacts application **1230**, a browser application **1232**, a book reader application **1234**, a location application **1242**, a media application **1244**, a messaging application **1246**, a game application **1248**, and a broad assortment of other applications such as a third-party application **1240**. The applications **1206** are programs that execute functions defined in the programs. Various programming languages can be employed to create one or more of the applications **1206**, structured in a variety of manners, such as object-oriented programming languages (e.g., Objective-C, Java, or C++) or procedural programming languages (e.g., C or assembly language). In a specific example, the third-party application **1240** (e.g., an application developed using the ANDROID™ or IOS™ software development kit (SDK) by an entity other than the vendor of the particular platform) may be mobile software running on a mobile operating system such as IOS™, ANDROID™, WINDOWS® Phone, or another mobile operating system. In this example, the third-party application **1240** can invoke the API calls **1250** provided by the operating system **1212** to facilitate functionality described herein,

Glossary

"Carrier signal" refers to any intangible medium that is capable of storing, encoding, or carrying instructions for execution by the machine, and includes digital or analog communications signals or other intangible media to facilitate communication of such instructions. Instructions may be transmitted or received over a network using a transmission medium via a network interface device.

"Client device" refers to any machine that interfaces to a communications network to obtain resources from one or more server systems or other client devices. A client device may be, but is not limited to, a mobile phone, desktop computer, laptop, portable digital assistants (PDAs), smartphones, tablets, ultrabooks, netbooks, laptops, multi-processor systems, microprocessor-based or programmable consumer electronics, game consoles, set-top boxes, or any other communication device that a user may use to access a network.

"Communication network" refers to one or more portions of a network that may be an ad hoc network, an intranet, an extranet, a virtual private network (VPN), a local area

network (LAN), a wireless LAN (WLAN), a wide area network (WAN), a wireless WAN (WWAN), a metropolitan area network (MAN), the Internet, a portion of the Internet, a portion of the Public Switched Telephone Network (PSTN), a plain old telephone service (POTS) network, a cellular telephone network, a wireless network, a Wi-Fi® network, another type of network, or a combination of two or more such networks. For example, a network or a portion of a network may include a wireless or cellular network and the coupling may be a Code Division Multiple Access (CDMA) connection, a Global System for Mobile communications (GSM) connection, or other types of cellular or wireless coupling. In this example, the coupling may implement any of a variety of types of data transfer technology, such as Single Carrier Radio Transmission Technology (1×RTT), Evolution-Data Optimized (EVDO) technology, General Packet Radio Service (GPRS) technology, Enhanced Data rates for GSM Evolution (EDGE) technology, third. Generation Partnership Project (3GPP) including 3G, fourth generation wireless (4G) networks, Universal Mobile Telecommunications System (UMTS), High Speed Packet Access (HSPA), Worldwide Interoperability for Microwave Access (WiMAX), Long Term Evolution (LTE) standard, others defined by various standard-setting organizations, other long-range protocols, or other data transfer technology.

"Component" refers to a device, physical entity, or logic having boundaries defined by function or subroutine calls, branch points, APIs, or other technologies that provide for the partitioning or modularization of particular processing or control functions. Components may be combined via their interfaces with other components to carry out a machine process. A component may be a packaged functional hardware unit designed for use with other components and a part of a program that usually performs a particular function of related functions. Components may constitute either software components (e.g., code embodied on a machine-readable medium) or hardware components. A "hardware component" is a tangible unit capable of performing certain operations and may be configured or arranged in a certain physical manner. In various examples, one or more computer systems (e.g., a standalone computer system, a client computer system, or a server computer system) or one or more hardware components of a computer system (e.g., a processor or a group of processors) may be configured by software (e.g., an application or application portion) as a hardware component that operates to perform certain operations as described herein. A hardware component may also be implemented mechanically, electronically, or any suitable combination thereof. For example, a hardware component may include dedicated circuitry or logic that is permanently configured to perform certain operations. A hardware component may be a special-purpose processor, such as a field-programmable gate array (FPGA) or an application specific integrated circuit (ASIC). A hardware component may also include programmable logic or circuitry that is temporarily configured by software to perform certain operations. For example, a hardware component may include software executed by a general-purpose processor or other programmable processor. Once configured by such software, hardware components become specific machines (or specific components of a machine) uniquely tailored to perform the configured functions and are no longer general-purpose processors. It will be appreciated that the decision to implement a hardware component mechanically, in dedicated and permanently configured circuitry, or in temporarily configured circuitry (e.g., configured by software), may be driven by cost and time considerations. Accordingly, the phrase "hardware component" (or "hardware-implemented component") should be understood to encompass a tangible entity, be that an entity that is physically constructed, permanently configured (e.g., hardwired), or temporarily configured (e.g., programmed) to operate in a certain manner or to perform certain operations described herein. Considering examples in which hardware components are temporarily configured (e.g., programmed), each of the hardware components need not be configured or instantiated at any one instance in time. For example, where a hardware component comprises a general-purpose processor configured by software to become a special-purpose processor, the general-purpose processor may be configured as respectively different special-purpose processors (e.g., comprising different hardware components) at different times. Software accordingly configures a particular processor or processors, for example, to constitute a particular hardware component at one instance of time and to constitute a different hardware component at a different instance of time. Hardware components can provide information to, and receive information from, other hardware components. Accordingly, the described hardware components may be regarded as being communicatively coupled. Where multiple hardware components exist contemporaneously, communications may be achieved through signal transmission (e.g., over appropriate circuits and buses) between or among two or more of the hardware components. In examples in which multiple hardware components are configured or instantiated at different times, communications between such hardware components may be achieved, for example, through the storage and retrieval of information in memory structures to which the multiple hardware components have access. For example, one hardware component may perform an operation and store the output of that operation in a memory device to which it is communicatively coupled. A further hardware component may then, at a later time, access the memory device to retrieve and process the stored output. Hardware components may also initiate communications with input or output devices, and can operate on a resource (e.g., a collection of information). The various operations of example methods described herein may be performed, at least partially, by one or more processors that are temporarily configured (e.g., by software) or permanently configured to perform the relevant operations. Whether temporarily or permanently configured, such processors may constitute processor-implemented components that operate to perform one or more operations or functions described herein. As used herein, "processor-implemented component" refers to a hardware component implemented using one or more processors. Similarly, the methods described herein may be at least partially processor-implemented, with a particular processor or processors being an example of hardware. For example, at least some of the operations of a method may be performed by one or more processors **1004** or processor-implemented components. Moreover, the one or more processors may also operate to support performance of the relevant operations in a "cloud computing" environment or as a "software as a service" (SaaS). For example, at least some of the operations may be performed by a group of computers (as examples of machines including processors), with these operations being accessible via a network (e.g., the Internet) and via one or more appropriate interfaces (e.g., an API). The performance of certain of the operations may be distributed among the processors, not only residing within a single machine, but deployed across a number of machines. In some examples, the processors or processor-

implemented components may be located in a single geographic location (e.g., within a home environment, an office environment, or a server farm). In other examples, the processors or processor-implemented components may be distributed across a number of geographic locations.

"Computer-readable storage medium" refers to both machine-storage media and transmission media. Thus, the terms include both storage devices/media and carrier waves/modulated data signals. The terms "machine-readable medium," "computer-readable medium" and "device-readable medium" mean the same thing and may be used interchangeably in this disclosure.

"Ephemeral message" refers to a message that is accessible for a time-limited duration. An ephemeral message may be a text, an image, a video and the like. The access time for the ephemeral message may be set by the message sender. Alternatively, the access time may be a default setting or a setting specified by the recipient. Regardless of the setting technique, the message is transitory.

"Machine storage medium" refers to a single or multiple storage devices and media (e.g., a centralized or distributed database, and associated caches and servers) that store executable instructions, routines and data. The term shall accordingly be taken to include, but not be limited to, solid-state memories, and optical and magnetic media, including memory internal or external to processors. Specific examples of machine-storage media, computer-storage media and device-storage media include non-volatile memory, including by way of example semiconductor memory devices, e.g., erasable programmable read-only memory (EPROM), electrically erasable programmable read-only memory (EEPROM), FPGA, and flash memory devices; magnetic disks such as internal hard disks and removable disks; magneto-optical disks; and CD-ROM and DVD-ROM disks. The terms "machine-storage medium," "device-storage medium," "computer-storage medium" mean the same thing and may be used interchangeably in this disclosure. The terms "machine-storage media," "computer-storage media," and "device-storage media" specifically exclude carrier waves, modulated data signals, and other such media, at least some of which are covered under the term "signal medium."

"Non-transitory computer-readable storage medium" refers to a tangible medium that is capable of storing, encoding, or carrying the instructions for execution by a machine.

"Signal medium" refers to any intangible medium that is capable of storing, encoding, or carrying the instructions for execution by a machine and includes digital or analog communications signals or other intangible media to facilitate communication of software or data. The term "signal medium" shall be taken to include any form of a modulated data signal, carrier wave, and so forth. The term "modulated data signal" means a signal that has one or more of its characteristics set or changed in such a matter as to encode information in the signal. The terms "transmission medium" and "signal medium" mean the same thing and may be used interchangeably in this disclosure.

What is claimed is:

1. A method, comprising:

displaying, by a messaging application running on a device, a capture user interface in accordance with a camera mode configured to capture multiple video clips for combining to generate a media content item;

displaying, by the messaging application, a carousel interface within the capture user interface, the carousel interface for presenting a first set of augmented reality content items, each augmented reality content item within the first set of augmented reality content items being selectable to apply respective augmented reality content to captured video;

receiving, by the messaging application, first user input selecting an explore tab included within the capture user interface, the explore tab being selectable to switch to an explorer user interface for presenting a second set of augmented reality content items;

switching, in response to receiving the first user input, from the capture user interface to the explorer user interface;

receiving, via the explorer user interface, second user input selecting an augmented reality content item from among the second set of augmented reality content items; and

in response to receiving the second user input,

switching from the explorer user interface to the capture user interface based on the selected augmented reality content item, and

updating the first set of augmented reality content items to include the selected augmented reality content item, such that the carousel interface persistently presents the selected augmented reality content item as part of the first set of augmented reality content items,

wherein display of the capture user interface in accordance with the camera mode is associated with a main camera instance of the messaging application, the main camera instance being separate from one or more modular camera instances associated other user interfaces of the messaging application, at least one of the one or more modular camera instances being associated with a reply interface wherein the capture user interface in accordance with the camera mode is configured to capture the multiple video clips while displaying a timeline progress bar comprising multiple segments, each of the multiple segments being updated within the timeline progress bar as each of the multiple video clips is captured.

2. The method of claim **1**, further comprising:

unlocking, in response to receiving the second user input, the selected augmented reality content item for use with respect to the main camera instance.

3. The method of claim **1**, wherein persistently presenting the selected augmented reality content item as part of the first set of augmented reality content items comprises storing an indication of the selected augmented reality content item in association with the main camera instance.

4. The method of claim **3**, further comprising:

removing the stored indication of the selected augmented reality content item upon completion of a session corresponding to the camera mode.

5. The method of claim **1**, further comprising:

storing a position within the explorer user interface in association with the main camera instance; and

navigating to the stored position within the explorer user interface in response to subsequent user input selecting the explore tab.

6. The method of claim **5**, wherein the explorer user interface includes a search interface for text-based searching of the second set of augmented reality content items,

wherein storing the position further comprises storing a text-based search term provided within the search interface, and

wherein navigating to the stored position further comprises pre-populating the search interface with the text-based search term in response to the subsequent user input.

7. The method of claim **1**, wherein the carousel interface is displayed in association with a browse tab included within the capture user interface, such that the browse tab is selectable to browse the first set of augmented reality content items via the carousel interface and the explore tab is selectable to browse or search the second set of augmented reality content items via the explorer user interface.

8. The method of claim **1**, wherein the first set of augmented reality content items is based on one or more of a geolocation of the device, an object detected in the captured video, a rear-facing or front-facing camera status of the device, user history associated with augmented reality content items, or user preferences associated with augmented reality content items.

9. The method of claim **1**, wherein the second set of augmented reality content items corresponds to augmented reality content items created by users of the messaging application.

10. The method of claim **1**, wherein the capture user interface in accordance with the camera mode is configured to receive, for each video clip of the multiple video clips, user selection of a different augmented reality content item to apply as the video clip is being captured.

11. A system comprising:

a processor; and

a memory storing instructions that, when executed by the processor, configure the processor to perform operations comprising:

displaying, by a messaging application, a capture user interface in accordance with a camera mode configured to capture multiple video clips for combining to generate a media content item;

displaying, by the messaging application, a carousel interface within the capture user interface, the carousel interface for presenting a first set of augmented reality content items, each augmented reality content item within the first set of augmented reality content items being selectable to apply respective augmented reality content to captured video;

receiving, by the messaging application, first user input selecting an explore tab included within the capture user interface, the explore tab being selectable to switch to an explorer user interface for presenting a second set of augmented reality content items;

switching, in response to receiving the first user input, from the capture user interface to the explorer user interface;

receiving, via the explorer user interface, second user input selecting an augmented reality content item from among the second set of augmented reality content items; and

in response to receiving the second user input,

switching from the explorer user interface to the capture user interface based on the selected augmented reality content item, and

updating the first set of augmented reality content items to include the selected augmented reality content item, such that the carousel interface persistently presents the selected augmented reality content item as part of the first set of augmented reality content items,

wherein display of the capture user interface in accordance with the camera mode is associated with a main camera instance of the messaging application, the main camera instance being separate from one or more modular camera instances associated other user interfaces of the messaging application, at least one of the one or more modular camera instances being associated with a reply interface wherein the capture user interface in accordance with the camera mode is configured to capture the multiple video clips while displaying a timeline progress bar comprising multiple segments, each of the multiple segments being updated within the timeline progress bar as each of the multiple video clips is captured.

12. The system of claim **11**, the operations further comprising:

unlocking, in response to receiving the second user input, the selected augmented reality content item for use with respect to the main camera instance.

13. The system of claim **11**, wherein persistently presenting the selected augmented reality content item as part of the first set of augmented reality content items comprises storing an indication of the selected augmented reality content item in association with the main camera instance.

14. The system of claim **13**, the operations further comprising:

removing the stored indication of the selected augmented reality content item upon completion of a session corresponding to the camera mode.

15. The system of claim **11**, the operations further comprising:

storing a position within the explorer user interface in association with the main camera instance; and

navigating to the stored position within the explorer user interface in response to subsequent user input selecting the explore tab.

16. The system of claim **15**, wherein the explorer user interface includes a search interface for text-based searching of the second set of augmented reality content items,

wherein storing the position further comprises storing a text-based search term provided within the search interface, and

wherein navigating to the stored position further comprises pre-populating the search interface with the text-based search term in response to the subsequent user input.

17. The system of claim **11**, wherein the carousel interface is displayed in association with a browse tab included within the capture user interface, such that the browse tab is selectable to browse the first set of augmented reality content items via the carousel interface and the explore tab is selectable to browse or search the second set of augmented reality content items via the explorer user interface.

18. The system of claim **11**, wherein the first set of augmented reality content items is based on one or more of a device geolocation, an object detected in the captured video, a rear-facing or front-facing camera status, user history associated with augmented reality content items, or user preferences associated with augmented reality content items.

19. A non-transitory computer-readable storage medium, the computer-readable storage medium including instructions that when executed by a computer, cause the computer to perform operations comprising:

displaying, by a messaging application, a capture user interface in accordance with a camera mode configured to capture multiple video clips for combining to generate a media content item;

displaying, by the messaging application, a carousel interface within the capture user interface, the carousel

interface for presenting a first set of augmented reality content items, each augmented reality content item within the first set of augmented reality content items being selectable to apply respective augmented reality content to captured video;

receiving, by the messaging application, first user input selecting an explore tab included within the capture user interface, the explore tab being selectable to switch to an explorer user interface for presenting a second set of augmented reality content items;

switching, in response to receiving the first user input, from the capture user interface to the explorer user interface;

receiving, via the explorer user interface, second user input selecting an augmented reality content item from among the second set of augmented reality content items; and

in response to receiving the second user input,

switching from the explorer user interface to the capture user interface based on the selected augmented reality content item, and

updating the first set of augmented reality content items to include the selected augmented reality content item, such that the carousel interface persistently presents the selected augmented reality content item as part of the first set of augmented reality content items,

wherein display of the capture user interface in accordance with the camera mode is associated with a main camera instance of the messaging application, the main camera instance being separate from one or more modular camera instances associated other user interfaces of the messaging application, at least one of the one or more modular camera instances being associated with a reply interface wherein the capture user interface in accordance with the camera mode is configured to capture the multiple video clips while displaying a timeline progress bar comprising multiple segments, each of the multiple segments being updated within the timeline progress bar as each of the multiple video clips is captured.

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